



Site Evaluation Quality Assurance Project Plan
U.S. Environmental Protection Agency
Region 4 Superfund Division
Atlanta, GA

Adapted for Site Evaluation from
SESD Category 2 QAPP

SECTION A: Project Planning Elements

A1. Title (Project Name): Liberty Fibers Phase II Expanded Site Inspection
EPA ID: TNN000410504
TDEC - DoR ID: 32-504

Project Location: Lowland, Hamblen County, Tennessee

Originating Organization: Tennessee Department of Environment and Conservation (TDEC)
Division of Remediation (DoR)
3711 Middlebrook Pike
Knoxville, Tennessee 37921

QAPP Prepared by (Name, Position, and Organization): Erin Sutton, EC3, TDEC-DoR

Preparer's Signature:

A handwritten signature in black ink, appearing to read "Erin Sutton".

Date: February 18, 2019

EPA Project Manager's Name and Position:

John Nolen, RPM

EPA Project Manager's Signature:

Date:



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A3. Distribution List

EPA - 1 electronic copy

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 4
61 Forsyth Street
Atlanta, Georgia 30303

TDEC DoR NCO - 1 electronic copy

William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 14th Floor
Nashville, TN 37243

TDEC DoR KFO - 1 electronic copy

Division of Remediation (DoR)
3711 Middlebrook Pike
Knoxville, Tennessee 37921

A4. Project Personnel, Organization and Responsibilities

Erin Sutton, TDEC-DoR (DoR): Project Management, Report Preparation, and Sample Collection.

Erin Sutton will be responsible for overall project management including authorship of the Phase II ESI QAPP and Phase II ESI Report, procurement of solid and aqueous sample containers (see below), oversight and/or collection of Global Positioning System (GPS) coordinates for all sample locations, managing the samples using the EPA's Contract Laboratory Program (CLP) procedures, sample quality assurance/quality control (QA/QC), SCRIBE database management, sample processing, label generation, sample shipment, report preparation and coordination of Phase II ESI QAPP and Phase II ESI Report submittal to EPA (John Nolen).

Shanda Hunt, DoR CLP Specialist:

Submittal of Soil and Ground Water Analytical Requests to EPA Region 4; Soil and Ground Water Sample Container Procurement and Trip Blank Preparation; Coordination of Container and Trip Blank Delivery to Erin Sutton

Pat Gribben, Lee Barron, and/or Justin Fisher, DoR: Field Assistance

Given the scope of sampling activities proposed in this QAPP, assistance from additional TDEC-DoR staff may be needed during this field event. Additional field sampling team members may include Pat Gribben, Lee Barron, and/or Justin Fisher. Their assistance



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may be needed to assist with coordination of field activities, preparation for field activities, TDEC-DoR Global Positioning System (GPS) unit operation, sample collection, and/or field activity documentation (i.e. completion of field notes and/or photo logs).

Tetra Tech (EPA HRS contractor), staff to be determined (will include a Professional Geologist {PG}): QAPP and SI Report Technical Review, Health and Safety Plan (HASP) Authorship, Phase II ESI Field Event Technical Assistance.

Phase II ESI field event technical assistance will include the following: Phase II ESI field event health and safety oversight, assistance to DoR with sampling activities, field documentation of sampling activities, procuring a portion of the sampling equipment (as described in Section B.2), operation of sampling equipment (DPT, hand augur, etc.), providing drums and managing investigation derived waste (IDW), and overseeing and/or assisting with decontamination activities.

EPA Science and Ecosystem Support Division – Field Services Branch, staff to be determined (will include a PG): Nolichucky River Sampling QAPP, collection of Nolichucky sediment core samples, and water water treatment pond sediment sampling.

Phase II ESI field event technical assistance for sampling the Nolichucky River and WWTP pond sediment activities include the following: supplying and operating boat mounted drill rig capable of obtaining sediment core samples, procurement of solid and aqueous sample containers (see below), collection of Global Positioning System (GPS) coordinates for all Nolichucky River sample locations, managing the samples using SESD procedures, sample quality assurance/quality control (QA/QC), SCRIBE database management, sample processing, label generation, sample shipment, documentation of field activities, and completing and/or approving the final core logs for the event.

Field sampling activities including applicable Standard Operating Procedures (SOPs) are further discussed in Section B2.

John Nolen EPA Region 4, Remedial Project Manager: SI QAPP and SI Report Review and Approval and Authorship and Procurement of Access Agreements

Organization Chart: See program-level QAPP

A5. Background:

Liberty Fibers is located in Lowland in Hamblen County, Tennessee and encompasses approximately 670-acres. Geographic coordinates for the center of the site are 36.15578° north latitude 83.20568° west longitude. The Liberty Fibers Site encompasses thirteen parcels owned by various entities as shown on the Sample Location Map to include Lowland Industrial Complex, Jm1 LLC, Environmental Waste Services LLC, Jolly Rock Investments, Paint Oak LLC, and the City of Morristown. The probable point of entry into the surface water pathway is



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in Flat Creek along State Route 160 with geographic coordinates of 36.15169° north latitude and 83.21513° west longitude at an approximate elevation of 1020-feet and Nylon Branch with geographic coordinates of 36.14975° north latitude and 83.20670° west longitude. Lower reaches of the site are located in the 100-year floodplain of the Nolichucky River/Douglas Lake (River Mile 7.25). The site is bounded to the west by the Nolichucky River/Douglas Lake, the north and east by residential and agricultural properties, and Lakeway Landfill (DSWM SNL32-0280) to the south.

A5.1 Geology and Hydrogeology

Liberty Fibers is located within the folded and faulted Valley and Ridge physiographic province. Deformation of the sedimentary bedrock into northeast trending structures formed long parallel valleys and ridges. The site is specifically underlain by the Ordovician-aged Sevier Shale approximately 5 miles southeast of Dumplin Valley Fault. This area is structurally complex and is extensively folded, faulted and fractured. The Sevier Shale in this area is characterized by blue, yellow-weathering silty to sandy generally calcareous shale interbedded with thin to thick beds of sandstone. The feldspathic sandstone in this section tends to be coarse and non-calcareous. This formation typically weathers into a thin soil with shale chips. Groundwater in the Sevier Shale is restricted to fractures. Due to the calcareous nature of the shale, the fractures typically have been enlarged by solution and tend to produce high yielding wells within 300-feet of the surface.

Topography in the Valley and Ridge Province of East Tennessee is characterized by parallel, elongated valleys interspersed with valleys trending northeast to southwest formed from the folding and faulting of sedimentary bedrock during the Paleozoic period. Varying rock types and structure has allowed streams to preferentially flow in areas where the underlying bedrock is less resistant due to rock type and structure. Trellis drainage patterns seen across this physiographic province are rectangular patterns that have long principal streams that are fed by small, perpendicular tributaries. These larger streams often discharge into larger rivers that meander across this pattern.

Surface water locally flows from the topographic highs toward the low valleys. Site dynamics are likely to be dictated by the TVA dammed Nolichucky River or Douglas Lake since Liberty Fibers occupies the floodplain. Topographically up gradient, surface water generally flows from the northeast to the southwest directly into Douglas Lake.

The probable point of entry (PPE) is at the confluence of Flat Creek and Nylon Branch approximately 900 feet east of the Nolichucky River/Douglas Lake RM 7.25. The geographic coordinates of the PPE are 36.15169° north latitude and 83.21513° west longitude. From the probable point of entry, the 15 mile extended surface water pathway is entirely within Douglas Lake. The 15-mile pathway ends at the Douglas Lake/French Broad River RM 61.62.



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A5.2 Facility Description

Currently there is an inactive rayon fiber manufacturing facility on the 670 acre Liberty Fibers site with several entrances from State Route 160/Enka Highway. The former rayon facility consists of numerous abandoned and demolished industrial buildings, chemical laboratory, aboveground storage tanks (AST's), clarifiers, neutralization pits, buried vaults and basements, four landfills, a water treatment plant, and an extensive system of subsurface pipes and drains. Five outfalls located along Flat Creek, Nylon Branch, and an adjacent agricultural pond exists.

The site is currently occupied by a several small businesses operating warehouses and machine fabrication. Site visits over the past few years by Division staff indicated issues site wide in regards to asbestos, lead-based paint, aboveground storage tanks, clarifiers, subsurface plumbing and underground vaults/basements, and active dumping.

A5.3 Operational & Regulatory History

Rayon and polyester fiber manufacturing processes began at the facility in 1948. Prior to waste management regulations, the facility disposed of site waste in an onsite landfill that include fly ash, viscose filter cloths, zinc removal sludge, and miscellaneous refuse. By the mid-1980's, hazardous waste at the facility was handled under EPA Hazardous Waste Permit TND 98-778-7330. Hazardous waste generated at the facility was stored on site prior to off-site disposal. Based on the TDEC-SWM file, several Notices of Violation were issued for improper hazardous waste handling. Waste generated included, but was not limited to, D001 ethyl alcohol, n hexane, lacquer thinner, synasol, varsol 18; D002 off quality viscose from rayon manufacture, viscose pads; D022 Chloroform from laboratory testing; F001 Zep 300 safety solvent; F003 waste paint and enamel thinner; F005 ameron thinner; P018 brucine; U002 acetone; U012 analine stain; U056 cyclohexane; U077 1,2 dichloroethane; U108 1,4 dioxane; U122 formaldehyde; U123 formic acid solution; u154 methanol; u165 naphthalene; u169 nirtobenzene; U211 tetrachloromethane; U220 toluene; U226 1,1,1 trichloroethane solvent; U239 xylene.

BASF historically landfilled their waste onsite in landfills under DSWM Permit IDL32-007 and Lenzing/Liberty Fibers operated disposal operations under IDL32-0093/SNL32-0274 as shown in the Sample Location Map. The Waste Water Treatment Plant was historically operated under NPDES Permit No. TN0068187 and is now owned and operated by the City of Morristown. There is one violation of NPDES Permit No. TN0068187 on file.

Various investigations and cleanup operations have occurred at the site since 1995 that include the Mercury Manometer (TDOR 32-515), State Remediation Program Nylon Plant Building (SRS 0396), Coal Yard A-2-1 & Sludge Lagoon Area (SRS 0981), and the entire facility (SRS 0951 & TDOR 32-506), as well as an emergency removal for primarily an asbestos release under the US EPA TDD No. TTEMI-05-001-0126.



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Of particular note is the Mercury Manometer that required clean up under a 1995 Consent Order with the Tennessee Division of Superfund (now Remediation) and the subsequent 1999 Record of Decision. Since a portion of the mercury release was not excavated due to infrastructure limitations, an Institutional Control and Access Restriction was deemed necessary that included a deed notice and sign notifying workers of the potential risk. According to the Division of Remediation files, a land use restriction was filed however observations at the site show it is clearly unmarked.

In 2002, EPA completed a Reassessment Report for American Enka (Liberty Fibers). This report was based on the available information and did not obtain any additional samples. It was assumed lead and mercury were present in the landfills. The groundwater pathway was not deemed significant due to the limited number of receptors. The surface water pathway was considered significant however there was an absence of sampling information to document contamination. Based on previous on previous and ongoing state activities at that time, the site was given a No Further Action Planned (NFRAP) designation.

The Sludge Lagoon Area was addressed under the State Remediation Program prior to the consolidation of it with the Tennessee Division of Remediation. Investigation into this parcel indicated the presence of PCBs that would require a land use restriction to limit future exposure. Restrictions include prohibition against residential use, excavation, and groundwater use.

The June 13, 2014 Liberty Fibers Emergency Response Report authored by Tetra Tech under EPA Contract No. EP-W-05-054 for TDD No. TTEMI-05-001-0126 outlined the extensive emergency response EPA completed with specific emphasis on asbestos removal. The report also outlined considerable environmental media sampling efforts. Of particular note, water and sediment collected from Outfalls 004 and 005 indicated the presence of bis(2-ethylhexyl)phthalate, Aroclor 1254, Aroclor 1260, copper, mercury, aluminum, iron, lead, and zinc that exceeded the Ecological Risk Assessment Screening Values in the Supplement to RAGS. It should also be noted that the presence of carbon disulfide was observed site wide in sediment, sludge, soil, and runoff water however the source of the carbon disulfide was not investigated.

The September 29, 2016 Site Inspection completed by the Tennessee Division of Remediation concluded numerous site related constituents were observed in every sediment sample collected during the investigation. Mercury, PCB's, and carbon disulfide were all observed to exceed three times background as well as the EPA Mid-Atlantic Risk Assessment Freshwater Sediment Screening Benchmarks in several facility outfalls. Additional analysis of the sediment also yielded concentrations of several polynuclear aromatic hydrocarbons (PAH's) and other compounds above screening levels.

Laboratory analysis of onsite soil in 2016 also yielded several constituents that were elevated and are attributable to historical facility operations. Several PAHs, PCBs, and several metals all exceeded three times background in the soils onsite. Of note was the concentration of mercury



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in one sample that exceeded the Regional Screening Levels for Industrial Use by an order of magnitude. Based on the results of the 2016 Site Inspection, the Division of Remediation recommended further evaluation through the CERCLA process.

On January 10, 2017 the Tennessee Division of Solid Waste Management referred the 5R Processors, EPA ID TNR 00-003-9057, to the Tennessee Division of Remediation for remedial action. A compliance inspection was conducted at the facility by the Hazardous Waste Section of the Division of Solid Waste Management on September 16, 2014 and a Notice of Violation was issued. An inventory of waste material submitted by the 5R Processors in July 2015 showed approximately 2.33 million pounds of face CRT glass, 3.12 million pounds of funnel glass, and 196,000 pounds of intact CRT tubes in storage at the facility warehouse. Much of the broken face and funnel glass is mixed in and therefore potentially contaminated with lead. In September 2015, TDEC-SWM was notified by the property owner that 5R Processors had abandoned all materials on-site.

The September 21, 2017 Expanded Site Inspection completed by the Tennessee Division of Remediation concluded numerous site related constituents were observed in every sediment sample collected during the investigation. During this investigation, TDEC Division of Water Resources personnel completed a fish survey within the lower portion of Flat Creek. This survey extended from the mouth of the creek at the Nolichucky River to immediately upstream of State Route 160. The survey indicated a relatively diverse and healthy fish community exists within Flat Creek. The fish captured and identified included 260 individuals of 25 species from 6 families including commonly consumed sunfish and bass.

A6. Project Description – Phase II Expanded Site Inspection (ESI):

Environmental samples collected during previous investigations have identified hazardous substances from the site have migrated into both Nylon Branch and Flat Creek. The presence of carcinogenic, bioaccumulative, and persistent hazardous substances in the sediment and surface water. The purpose of this Phase II Expanded Site Inspection is to further document the presence of hazardous substances at known process areas including the waste water treatment facility, waste areas, and in the surface water sediment.

Potential targets for this site include workers at the site, surrounding residents that use groundwater for domestic water supply, residents who may access the site by foot, protected species, Douglas Lake Fishery and accompanying wetlands, and the White Pine Wellhead Protection Area. The surface water pathway is considered the primary pathway of concern for this project.

A total of 67 samples plus quality control and duplicate samples are proposed for this study. The sampling schedule is subject to modification by conditions encountered in the field, but is tentatively planned as outlined in the following subsections. Please refer to Section B1 for the proposed sample locations and rationale.



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One groundwater sample will be collected from the adjacent private well. It is located at the Pilkenton Residence located at 2952 Alexander Road and is approximately 500-feet north of the BASF North Landfill. These data will be used to determine the water quality of the private well and be used to assess the groundwater pathway. This sample will have the designation of LF16-0319GW.

Nine surface and subsurface soil samples will be collected at former process areas to determine source location. These samples will have the designations of:

<i>LF45-0319SB</i>	<i>LF49-0319SB</i>	<i>LF79-0319SF</i>
<i>LF46-0319SB</i>	<i>LF50-0319SB</i>	
<i>LF47-0319SB</i>	<i>LF51-0319SB</i>	
<i>LF48-0319SB</i>	<i>LF52-0319SB</i>	

Five sediment sample locations along Flat Creek are proposed for this investigation. All five will be collected from 0 to 1-feet below top of sediment and three from between 1 to 3-feet below top of sediment, or as conditions allow. Due to the age of the facility, there is the potential of a release to the surface water and groundwater pathways. These samples will have designations of:

<i>LF56-0319SD-A</i>	<i>LF35-0319SD</i>
<i>LF56-0319SD-B</i>	<i>LF59-0319SD-A</i>
<i>LF57-0319SD</i>	<i>LF59-0319SD-B</i>
<i>LF58-0319SD-A</i>	
<i>LF58-0319SD-B</i>	

Seven sediment sample locations along Nylon Branch and Lakeway Landfill drainage are proposed for this investigation. All five will be collected from 0 to 1-feet below top of sediment and two from between 1 to 3-feet below top of sediment, or as conditions allow. Due to the age of the facility, there is the potential of a release to the surface water and groundwater pathways. These samples will have designations of:

<i>LF06-0319SD-A</i>	<i>LF60-0319SD-A</i>	<i>LF09-0319SD</i>
<i>LF06-0319SD-B</i>	<i>LF60-0319SD-B</i>	<i>LF81-0319SD</i>
<i>LF07-0319SD</i>	<i>LF33-0319SD</i>	<i>LF83-0319SD</i>

Seven sediment sample locations along the Nolichucky River are proposed for this investigation. All seven sampling locations will collect sediment from 0 to 1-feet, 1 to 3-feet, and 3 to 5-feet below top of sediment or as conditions allow. Due to the age of the facility, there is the potential of a release to the surface water and groundwater pathways. These samples will have designations of:



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<i>LF36-0319SD-A</i>	<i>LF62-0319SD-A</i>	<i>LF64-0319SD-A</i>	<i>LF66-0319SD-A</i>
<i>LF36-0319SD-B</i>	<i>LF62-0319SD-B</i>	<i>LF64-0319SD-B</i>	<i>LF66-0319SD-B</i>
<i>LF36-0319SD-C</i>	<i>LF62-0319SD-C</i>	<i>LF64-0319SD-C</i>	<i>LF66-0319SD-C</i>
<i>LF61-0319SD-A</i>	<i>LF63-0319SD-A</i>	<i>LF65-0319SD-A</i>	
<i>LF61-0319SD-B</i>	<i>LF63-0319SD-B</i>	<i>LF65-0319SD-B</i>	
<i>LF61-0319SD-C</i>	<i>LF63-0319SD-C</i>	<i>LF65-0319SD-C</i>	

Fourteen effluent and waste samples will be collected from the BASF Historic North Landfill, Waste Water Treatment Plant, clarifier sludge, piping, hazardous waste incinerator, and basement water to determine waste characteristics. These samples will have the designations of:

<i>LF53-0319WA</i>	<i>LF54-0319WA</i>	<i>LF55-0319WA</i>	<i>LF04-0319EF</i>
<i>LF03-0319EF</i>	<i>LF02-0319EF</i>	<i>LF32-0319EF</i>	<i>LF67-0319EF</i>
<i>LF68-0319WA</i>	<i>LF69-0319WA</i>	<i>LF70-0319WA</i>	<i>LF80-0319WA</i>
<i>LF68-0319WA-A</i>	<i>LF82-0319WA</i>		

Six sediment samples will be collected from the equalization basin, aeration basin, and the cooling lagoon at the Waste Water Treatment Plant to determine source characteristics. These samples will have the designations of:

<i>LF71-0319SD</i>	<i>LF75-0319SD</i>
<i>LF72-0319SD</i>	<i>LF76-0319SD</i>
<i>LF73-0319SD</i>	<i>LF77-0319SD</i>
<i>LF74-0319SD</i>	<i>LF78-0319SD</i>

These will be accompanied by a MS/MSD analysis for SESD QA/QC. Appropriate quality control samples, consisting of MS/MSD, trip blanks and duplicates will be collected. Please refer to Section B1 for locations and rationale.

Groundwater, subsurface soil, sediment, waste, and effluent samples will be analyzed at contract labs for total metals and semi-volatile organic compounds including PAH's and PCBs. CLP lists of analytes are included in Addendum B. Select waste samples will also be analyzed for TCLP Metals. The clarifier samples will also include volatile organic compounds. All sampling locations in each media will be plotted via Global Positioning System (GPS).

The Site Map and Sampling Location Plans are located in Addendum D. Key personnel and equipment for this effort are listed in B2.

The proposed schedule for this project is for sampling to occur the week of March 11, 2019. It is expected that analytical data from the EPA contract CLP laboratory would be received by the week of May 1, 2019. Data validation and report preparation is expected to take 2 to 4 weeks. The report will be sent to EPA no later than June 30, 2019.



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The sampling effort will culminate in a Phase II Expanded Site Inspection report. The sampling events will be documented in logbooks by the sampling team. Log entries will include GPS locations for samples, pH measurements, weather conditions, time and date of sample collection, photo descriptions, etc. Chain of custody forms will be transported to the lab with samples and copies will be retained at the TDEC Field Office. The CLP Laboratories will return reports on sample results and QA/QC documentation within the turnaround criteria for each type of analysis specified in CLP contracts. The results will be validated and reported in the inspection report. This report will include a HRS (Quickscore) Report. It will include text describing the site history, geology, climate, location, and a discussion of the HRS score with targets and conclusions. The report will include appendices containing copies of the logbooks, lab results, chain of custody forms, data validation, photos, sample maps, etc.

The surface water pathway is the HRS pathway of concern for the purposes of this QAPP. Phase II ESI activities will include collection of non-sampling data (access, utility clearance, well survey activities, sample location coordinates, etc.), installation of monitoring wells and collection of ground water samples, collection of subsurface soil (potential source and source delineation) samples, and soil gas probe installation and sample collection. SI activities are further detailed in Section B. Division of responsibilities for SI activities are described in Section A4 and further discussed in Section B. Since Tetra Tech will author the Health and Safety Plan (HASP) for the SI, the HASP will be submitted to the EPA under separate cover.

A6.1 Decisions to be Made Based upon the Data

The SI is being conducted based upon the recommendations of the September 2017 Expanded Site Inspection Report. The report indicated a need for further investigation of the site through the EPA's Site Assessment Program, principally due to the surface water pathway as discussed in Section A5.3.

A6.2 Applicable Regulatory Information and Action Levels

If VOCs are detected in soil and/or ground water, DoR will compare the results to the site-specific background data to determine if the concentrations are HRS-elevated, as noted above. HRS Level II concentrations are results that exceed background concentrations, but not HRS Superfund Chemical Data Matrix (SCDM) benchmarks. DoR will determine if the concentrations of VOCs are representative of HRS Level I concentrations by comparing the results to HRS SCDM benchmarks as identified below. HRS Level I concentrations are established when the results exceed applicable background concentrations and SCDM benchmarks. SCDM benchmarks are not available for all constituents on the analyte list. DoR will compare these constituents to applicable regulatory screening levels, such as the EPA's Regional Screening Levels (RSLs), most recent version, to determine if the results exceed applicable RSLs. In situations where HRS SCDM benchmarks are not available and RSLs are used for comparison purposes, HRS Level I concentrations will not be assigned to these constituents. These constituents will only be identified as HRS Level II concentrations and/or RSL exceedances, if applicable.



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Mercury

EPA RML Industrial Soil 140 mg/kg

EPA RSL Industrial Soil 4 mg/kg

SCDM Soil Non-Cancer Risk 12 mg/kg

MCL 2.0 µg/L

Tap water RSL 0.063 µg/L

SCDM Surface Water Food Chain Non-Cancer Risk 0.24 mg/kg

EPA Region III BTAG Freshwater Sediment Screening Benchmarks 0.18 mg/kg

PCB 1254

EPA RML Industrial Soil 44 mg/kg

EPA RSL Industrial Soil 0.97 mg/kg

Tap water RSL 0.0078 µg/L

SCDM Surface Water Food Chain Non-Cancer Risk 0.03 mg/kg

EPA Region III BTAG Freshwater Sediment Screening Benchmarks Total PCBs 0.0598 mg/kg

PCB 1260

EPA RML Industrial Soil 99 mg/kg

EPA RSL Industrial Soil 0.99 mg/kg

Tap water RSL 0.0078 µg/L

SCDM Surface Water Food Chain Non-Cancer Risk 0.03 mg/kg

EPA Region III BTAG Freshwater Sediment Screening Benchmarks Total PCBs 0.0598 mg/kg

Lead

EPA RML Industrial Soil 800 mg/kg

EPA RSL Industrial Soil 800 mg/kg

EPA MCL 15 µg/L

SCDM Freshwater Chronic CCC 2.5 µg/L

EPA Region III BTAG Freshwater Sediment Screening Benchmarks 35.8 mg/kg

These constituents are the most anticipated. Other analytes detected will be compared to the appropriate criteria in a similar fashion. More complete information can be obtained in Addendum B and at:

www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query?substanceAuto=pcb
www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
www.epa.gov/risk/regional-removal-management-levels-chemicals-rmls
www.epa.gov/risk/freshwater-sediment-screening-benchmarks

A6.3 Schedule and Deliverable Dates

Field Study Date:

Anticipated for January 2019 (pending QAPP approval, field team availability, and weather conditions)



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Projected Lab Completion Date:	Estimated 35 day turnaround for samples submitted to the Regional Laboratory; estimated 45 - 60 day turnaround for samples submitted to a CLP laboratory (i.e. 21 days for laboratory submittal of the data to EPA Region 4 Quality Assurance {QA} Section and one month to 6 week turnaround for EPA QA review and submittal to DoR);
Final Report Completion Date:	Best efforts will be made to provide the report to the EPA on or before April 29, 2019.

A7. Quality Objectives and Criteria

The DQO steps are as follows:

Step 1.) Problem

The June 13, 2014 Liberty Fibers Emergency Response Report prepared by Tetra Tech under EPA Contract No. EP-W-05-054 was submitted to the Tennessee Division of Remediation that revealed the presence of a hazardous constituent found two facility outfalls. The 2016 Site Inspection and 2017 Expanded Site Inspections confirmed the surface water pathway was impacted with mercury, PCBs, and other site related hazardous substances. This Phase II Expanded Site Inspection will determine if there are additional source areas and further assess the surface water pathway. In this effort, EPA Science and Ecosystem Support Division – Field Services Branch will be collecting samples from the Nolichucky River and TDEC personnel will oversee the EPA START Contractor taking samples of subsurface soil, sediment, waste, and effluent to further establish contaminant migration and the extent of threat to human health and the environment.

Step 2.) Decision

The principal objective of this inspection is to provide analytical data to support site management decisions and complete a Hazard Ranking System (HRS) score. The HRS score will be used to determine if further assessment work should be conducted under the CERCLA program or if clean-up action should be recommended.

Step 3.) Inputs to the Decision

Based on previous information, the surface water pathway is considered to be the major pathways of concern. Source samples and surface water sediment samples will be collected to determine if hazardous substances related to site sources are migrating to the surface water pathway. Additional sources to be sampled include the BASF North Landfill waste, Waste Water Treatment Plant pond sediment, pipe water, clarifier sediment, and soil. Sediment samples will also be collected along Flat Creek, Nylon Branch, and in the Nolichucky River. Since the facility ceased operations over 15 years ago, sediment samples will be collected at different depths below top of sediment to confirm a release to the surface water pathway.



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Most surface water drainage from the site either enters Flat Creek or Nylon Branch prior to entering the Nolichucky River/Douglas Lake near mile 7.25. The end of the 15 mile extended surface water pathway occurs at the French Broad River/Douglas Lake mile 61.62. It is heavily used for fishing, boating, recreation, and agriculture. An estimated 505,662 pounds of fish are harvested annually from the Douglas Lake Fishery. Three critical habitat areas for the Cumberland Combshell, Oyster Mussel, and Purple Bean are listed by the US Fish and Wildlife Service within a half mile radius of the site. A Tennessee Wildlife Resource Agency Area Managed for Conservation Mullins Island is also within a half mile radius of the site.

The surface water pathway will be evaluated for metals and semi-volatile organic compounds including PAHs and PCBs. Results will be compared to HRS SCDM benchmarks when available. If SCDM benchmarks are not available, DoR will compare the results to the EPA's RSLs or the EPA Region III BTAG Freshwater Sediment Screening Benchmarks. Since the RSLs are not HRS benchmarks, HRS Level I concentrations will not be assigned based upon RSL exceedances. Additionally, soil samples will be collected to assess the presence of a suspected source and to potentially provide initial delineation of the source. The soil direct contact pathway is associated with soil samples collected at depths of 2 ft. or less. Since all soil samples proposed are subsurface soil samples and will likely be collected at depths greater than 2 ft., this information will only be used to evaluate the presence of a source and not the soil (direct contact) pathway. Therefore, it is anticipated that the soil samples collected from the site will be compared strictly to background samples to determine if the samples contain elevated concentrations. If soil samples are collected at depths less than 2 ft., the results for these samples will also be compared to SCDM benchmarks and/or RSLs in order to evaluate the soil direct contact pathway. Therefore, soil benchmarks are provided to ensure the detection limits for analysis of the soil samples are appropriately low.

All samples will be analyzed by labs in the SESD Lab or Contract Laboratories Program (CLP). All QA/QC procedures and methods associated with the CLP will apply. The CLP analytical methods are detailed in the CLP Statement of Work (SOW) for Multi-Media, Multi-Concentration Organics Analysis (SOM02.4), Inorganics (ISM02.4) and are available on the internet at:

<https://www.epa.gov/clp/what-are-superfund-contract-laboratory-programs-methods-analysis>

The nature and extent of the potential site contaminants remain unknown. In general, the lowest available Contract Required Quantitation Limits (CRQLs) will be requested for these exploratory samples. See A6 and Addendum B for critical analytes and regulatory criteria.

Step 4.) Study Boundaries

Liberty Fibers is located in Lowland in Hamblen County, Tennessee and encompasses approximately 670-acres. Geographic coordinates for the center of the site are 36.15578° north



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latitude 83.20568° west longitude. The Liberty Fibers Site encompasses thirteen parcels owned by various entities as shown on the Sample Location Map to include Lowland Industrial Complex, Jm1 LLC, Environmental Waste Services LLC, Jolly Rock Investments, Paint Oak LLC, and the City of Morristown.

Samples will be collected on the main 13 parcels that encompass the site as well as in the adjacent Nolichucky River to determine if site related contamination has migrated to the fishery. In addition, a nearby private residential well that has historically shown elevated site related constituents will be re-sampled for water quality.

Step 5.) Decision Rule

No independent, statistically-based, hypothesis test is proposed. No media will have sufficient sample numbers for a complex statistical analysis. The HRS scoring system, itself, will be the primary decision criteria.

Site-specific background screening concentrations have been established for subsurface soil and sediment for the HRS evaluation process. The procedure specifies that if the background concentration of an analyte is greater or equal to its detection limit, the minimum requirement for an observed release for a particular contaminant is for it to be at least three times greater than the background concentration. If a specific analytes background concentration is below the detection limit, the minimum requirement for an observed release is that it exceeds the sample quantitation limit of the background sample.

All sample results will affect the overall HRS score of the site by confirming or eliminating potential pathways of concern and weighing those pathways against the distance and number of potential targets. The HRS also has a set of toxicity factors called Superfund Chemical Data Matrix (SCDM). HRS calculations rank chemicals based on relative toxicity for a given media or pathway. This way relative toxicity also contributes to the overall score. If the HRS score is in excess of 28.5, the site will be presented for further consideration under CERCLA. If the site is not considered for action under CERCLA, it may still be considered for further study by the Tennessee Department of Environment and Conservation.

Sample results will be compared to the following regulatory screening criteria to screen for risk to human health and the environment. This comparison will primarily be used to support or reject promulgation under the State of Tennessee regulations.

- Soils: US-EPA Regional Screening Levels
- Groundwater: US-EPA Regional Screening Levels and US-EPA Maximum Contaminant Levels
- Sediment: EPA Region III BTAG Freshwater Sediment Screening Benchmarks
- Waste: US-EPA Removal Management Levels and US EPA Maximum Concentration of Contaminants for Toxicity Characteristic



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Please see A6 and Addendum B for further information.

Step 6.) Limits on Decision

No statistical hypothesis testing is proposed because of the nature of the sampling event. If observed contamination in a specific media exceeds the media background concentrations as stated above, that data will be used to develop an HRS score for the site to determine if further assessment work should be conducted under the CERCLA program based on the risk to human health and the environment determined by the number of potential receptors in a specific HRS target distance limit.

Step 7.) Refining Sampling Design

The sampling plan for this effort includes collection of site-specific background samples. The sampling design will be reviewed by Tetra Tech. Review and approval by EPA Region IV Site Evaluation Coordinator, John Nolen, is required prior to resource allocation. These steps assure that data gaps are evaluated and properly addressed/minimized during a proposed sampling event. The sample locations proposed in this QAPP were selected by DoR and Tetra Tech in consultation with EPA using best professional judgment.

Also see the State of Tennessee *Program-Level Quality Assurance Project Plan for Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreements*.

A8. Special Training/Certifications

All DoR, Tetra Tech, and EPA SESD personnel expected on site are OSHA HAZWOPER trained. Tetra Tech and DoR personnel have also received EPA sampling and SA training courses. Additionally, sampling personnel are experienced in the methods and techniques that will be utilized. Documentation of Tetra Tech staff training activities will be provided to the EPA under separate cover.

Also see the *State of Tennessee Program-Level Quality Assurance Project Plan For Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreements*.

A9. Documents and Records

Records and documents for this project include field notes, computer files of raw data (GPS readings, analytical data, chains of custody, photographic logs, field notes, and data validation reports/data quality assessments reports). The final document will be an ESI Report for the Former Liberty Fibers site. This document will include the data gathered during the upcoming sampling event as described in this QAPP. All documents and computer files will be stored at the TDEC Knoxville Field Office. DoR records are maintained in perpetuity in the Knoxville Field Office. All records pertinent to a site are maintained in paper or electronic format until all site activities have ceased and a final disposition has been achieved for the site. Site files are then scanned electronically and are stored and available for review on computer.



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All field observations, measurements and sampling activities supporting the field investigation will be recorded and documented according to the EPA's Science and Ecosystem Support Division (SESD) Operating Procedure for Logbooks, SESDPROC-010-R5 (May 30, 2013) (Reference 24 and Appendix E).

Special consideration shall be taken with respect to field notes to include a visual description of the samples collected, including a description of organic matter in the sediments. Field notes shall also include a comprehensive assessment of topography and drainage patterns that would support documentation of overland flow migration from each source and ultimately to a PPE.

The expected turnaround time for samples submitted to the EPA Regional Laboratory will be approximately 35 days from the lab's receipt of the samples. If samples are submitted to a CLP Laboratory, the expected turnaround time for results is approximately 45-60 days to allow for EPA QA review. Please reference the Analytical Support Branch, Laboratory Operations and Quality Assurance Manual at <http://epa.gov/region4/sesd/asbsop/asp-loqam.pdf>.

SECTION B: Data Generation and Acquisition

B1. Sampling Design

The COPCs at this site that will be further investigated during this sampling event primarily include lead, mercury, and PCBs. DoR will assess the presence or absence of a release of COPCs through sample collection. Sixty two (62) samples are proposed for collection to assess the presence of a hazardous substances in various potential sources and determine if these constituents are migrating to the surface water pathway. Approximately four duplicates and four matrix spike/matrix spike duplicate (MS/MSD) solid samples are also proposed for QA/QC purposes. Since aqueous samples will also be collected, one duplicate and one matrix spike/matrix spike duplicate (MS/MSD) aqueous samples are also proposed for QA/QC purposes. Specific details of the sampling design are provided below.



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Station ID	Sample ID	Depth (feet bgs)	Sample Type	Sample Location	Analysis	Rationale
Surface and Subsurface Soil Samples						
LF45	LF45-0319SB	TBD	Grab	North of the Liberty Fibers, outside influence of contamination, location to be determined in the field	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF46	LF46-0319SB	TBD	Grab	Northwestern area of Liberty Fibers property	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF47	LF47-0319SB	TBD	Grab	Northwestern area of Liberty Fibers property	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF48	LF48-0319SB	TBD	Grab	Northwestern area of Liberty Fibers property, south of the clarifier	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF49	LF49-0319SB	TBD	Grab	Northwestern area of Liberty Fibers property, west of the Mercury Manometer Site	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF50	LF50-0319SB	TBD	Grab	Area of Mercury Manometer Site	Metals & Hg TCLP Metals&Hg PCBs & PAHs	Determine presence or absence of contamination
LF51	LF51-0319SB	TBD	Grab	Area of Mercury Manometer Site	Metals & Hg TCLP Metals&Hg PCBs & PAHs	Determine presence or absence of contamination
LF52	LF52-0319SB	TBD	Grab	North of Mercury Manometer Site	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF79	LF79-0319SF	TBD	Comp	Hazardous Waste Incinerator	Metals & Hg TCLP Metals&Hg PCBs & PAHs	Determine presence or absence of contamination



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Sediment Samples Along Flat Creek						
LF56	LF56-0319SD-A LF56-0319SD-B	0 to 1' 1 to 3'	Grab	Background sediment sampling location; depositional area along Flat Creek up gradient of Outfall 005	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF57	LF57-0319SD	0 to 1'	Grab	Just downstream of Outfall 005; depositional area along Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF58	LF58-0319SD-A LF58-0319SD-B	0 to 1' 1 to 3'	Grab	Just downstream of Outfall 004; depositional area along Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF35	LF35-0319SD	0 to 1'	Grab	Depositional area along Flat Creek, just downstream from where Outfall 003 effluent enters Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF59	LF59-0319SD-A LF59-0319SD-B	0 to 1' 1 to 3'	Grab	Depositional area along Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
Sediment Samples Along Nylon Branch						
LF06	LF06-0319SD-A LF06-0319SD-B	0 to 1' 1 to 3'	Grab	Depositional area along Nylon Branch downstream of seep from BASF Historic Landfill	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF07	LF07-0319SD	0 to 1'	Grab	Depositional area along Nylon Branch	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF09	LF09-0319SD	0 to 1'	Grab	Depositional area along Nylon Branch	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF60	LF60-0319SD-A LF60-0319SD-B	0 to 1' 1 to 3'	Grab	Depositional area along Nylon Branch; just downstream of Outfall 002	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF33	LF33-0319SD	0 to 1'	Grab	Depositional area along Nylon Branch; south of the WWTP ponds	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination



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LF81	LF81-0319SD-A LF81-0319SD-B	0 to 1' 1 to 3'	Grab	Drainage from the Lakeway Landfill	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF83	LF83-0319SD-A LF83-0319SD-B	0 to 1' 1 to 3'	Grab	Background sediment sampling location; depositional area along Nylon Branch up gradient of BASF North Landfill	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination

Sediment Samples Along Nolichucky River						
Station ID	Sample ID	Depth (feet bgs)	Sample Type	Sample Location	Analysis	Rationale
Sediment Samples Along Nolichucky River						
LF36	LF36-0319SD-A LF36-0319SD-B LF36-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	Confluence of Flat Creek with Nolichucky River (depositional area)	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF61	LF61-0319SD-A LF61-0319SD-B LF61-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	Confluence of Nylon Branch with Nolichucky River (depositional area)	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF62	LF62-0319SD-A LF62-0319SD-B LF62-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	East bank of Nolichucky River, downstream of its confluence with Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF63	LF63-0319SD-A LF63-0319SD-B LF63-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	East bank of Nolichucky River, downstream from its confluence with Nylon Branch and upstream of its confluence with Flat Creek	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF64	LF64-0319SD-A LF64-0319SD-B LF64-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	East bank of Nolichucky River, upstream of its confluence with Nylon Branch and downstream of the WWTP effluent discharge	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF65	LF65-0319SD-A LF65-0319SD-B LF65-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	East bank of Nolichucky River, immediately downstream of the WWTP effluent discharge	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination



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LF66	LF66-0319SD-A LF66-0319SD-B LF66-0319SD-C	0 to 1' 1 to 3' 3 to 5'	Grab	East bank of Nolichucky River, upstream of the WWTP effluent discharge	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
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Effluent and Waste Samples						
Station ID	Sample ID	Depth (feet bgs)	Sample Type	Sample Location	Analysis	Rationale
LF53	LF53-0319WA	TBD	Grab	BASF historic landfill waste	Metals & Hg TCLP Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF54	LF54-0319WA	TBD	Grab	BASF historic landfill waste	Metals & Hg TCLP Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF55	LF55-0319WA	TBD	Grab	BASF historic landfill waste	Metals & Hg TCLP Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF04	LF04-0319EF	NA	Grab	Effluent from Outfall 002	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF03	LF03-0319EF	NA	Grab	Effluent from Outfall 003	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF02	LF02-0319EF	NA	Grab	Effluent from Outfall 004	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF32	LF32-0319EF	NA	Grab	Effluent from Outfall 005	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF67	LF67-0319EF	NA	Grab	Effluent from WWTP	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF68	LF68-0319WA-A LF68-0319WA-B	0-1' 3-5'	Grab	Clarifier sludge	Metals & Hg TCLP Metals & Hg PCBs & PAHs VOCs	Determine presence or absence of contamination
LF82	LF82-0319WA	NA	Grab	Clarifier drain (aqueous)	Metals & Hg PCBs & PAHs VOCs	Determine presence or absence of contamination



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LF69	LF69-0319EF	NA	Grab	Pipe water	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF70	LF70-0319WA	NA	Grab	Basement water	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF80	LF90-0319WA	NA	Grab	Hazardous Waste Incinerator	Metals & Hg TCLP Metals & Hg	Determine presence or absence of contamination

Sediment Samples from WWTP						
Station ID	Sample ID	Depth (feet bgs)	Sample Type	Sample Location	Analysis	Rationale
LF71	LF71-0319SD	TBD	Grab	Equalization Basin at outfall pipe	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF72	LF72-0319SD	TBD	Grab	Equalization Basin at outfall pipe	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF73	LF73-0319SD	TBD	Grab	Equalization Basin at outfall pipe	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF74	LF74-0319SD	TBD	Grab	Aeration Basin at outfall pipe	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF75	LF75-0319SD	TBD	Grab	Aeration Basin at equalization basin outfall pipe	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
LF76	LF76-0319SD	TBD	Grab	Cooling Lagoon	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination
Private Well						
LF16	LF16-0319PW	NA	Grab	Pilkenton Well	Metals & Hg PCBs & PAHs	Determine presence or absence of contamination



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Station ID	Sample ID	Depth (feet bgs)	Sample Type	Sample Location	Analysis	Rationale
Quality Assurance/Quality Control (QA/QC) Sample Locations - Solid						
LF50	LF50-0319SBD	TBD	Grab	Duplicate	Metals & Hg TCLP Metals & Hg PCBs & PAHs	Verify reproducibility of laboratory and field procedures
LF54	LF54-0319WAD	TBD	Grab	Duplicate & MS/MSD (TCLP)	Metals & Hg TCLP Metals & Hg PCBs & PAHs	Verify reproducibility of laboratory and field procedures Check accuracy and precision of analysis for TCLP
LF60	LF60-0319SD-AD	0 to 1'	Grab	Duplicate	Metals & Hg PCBs & PAHs	Verify reproducibility of laboratory and field procedures
LF36	LF36-0319SD-BD	1 to 3'	Grab	Duplicate	Metals & Hg PCBs & PAHs	Verify reproducibility of laboratory and field procedures
LF46	LF46-0319SB	TBD	Grab	MS/MSD	Metals & Hg PCBs & PAHs	Check accuracy and precision of analysis
LF35	LF35-0319SD	0 to 1'	Grab	MS/MSD	Metals & Hg PCBs & PAHs	Check accuracy and precision of analysis
LF71	LF71-0319SD	TBD	Grab	MS/MSD	Metals & Hg PCBs & PAHs	Check accuracy and precision of analysis
Quality Assurance/Quality Control (QA/QC) Sample Locations - Aqueous						
LF16	LF16-0319GWS	NA	Grab	Split	Metals & Hg PCBs & PAHs	Evaluate sample handling variability
LF04	LF04-0319EF	NA	Grab	MS/MSD	Metals & Hg PCBs & PAHs	Check accuracy and precision of analysis
#R4DART#	LF0319RW1	NA	Grab	Rinsate Blank	Metals & Hg PCBs & PAHs	Verify that soil sampling equipment is properly decontaminated (RW1)
#R4DART#	LF0319RW2	NA	Grab	Rinsate Blank	Metals & Hg PCBs & PAHs	Verify that sediment sampling equipment is properly decontaminated (RW2)
#R4DART#	LF0319RW3	NA	Grab	Rinsate Blank	Metals & Hg PCBs & PAHs	Verify that waste sampling equipment is properly decontaminated (RW3)



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Notes:

bgs	Below ground surface	ID	Identification	NA	Not applicable	SB	Subsurface soil sample
EF	Effluent	LF	Liberty Fibers	PAHs	Polycyclic aromatic hydrocarbons	SD	Sediment
PW	Private Well	MS/MSD	Matrix Spike/Matrix Duplicate	PCBs	Polychlorinated biphenyls	TBD	To be determined



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Fewer samples may be analyzed than currently proposed in this QAPP, pending access to station locations. Samples may also be collected at alternate station locations, pending access to properties, the presence of utilities, etc. All deviations from the QAPP will be documented in the field notes. If samples are collected (for example) in April rather than March of 2019, the station locations and media designations will remain the same but the date-based portion of the sample number will be 0419.

B2. Investigation Activities, Sampling Methods, and General Procedures

B2.1 Site Access

Per Tennessee Code Annotated (TCA) 68-212-216, the TDEC Commissioner or the Commissioner's designee has the right to enter any place where hazardous substances or substances which may be hazardous, are, or may have been generated, stored, transported, treated, disposed of, or otherwise handled. However, since this investigation is being conducted pursuant to the authority and requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, Public Law 196-510; Section 104; and the Superfund Amendments and Reauthorization Act (SARA), Public Law 99-499 under the authority of the EPA, the EPA with assistance from DoR and/or Tetra Tech will obtain written access agreements for all properties included in this sampling event.

B2.2 Underground Utility Clearance

At least three working days prior to field activities, Tetra Tech will contact Tennessee One Call to mark underground public utilities in the vicinity of all subsurface soil and boring locations at the site and at the proposed site-specific background location. Since Tennessee One Call only marks public utilities, Tetra Tech will procure a geophysical survey contractor to mark private utilities prior to initiation of subsurface investigation activities. Station locations may be adjusted in the field pending the presence of utilities/obstructions. The names of station locations will be adjusted, as needed, in the event currently proposed station locations cannot be used and/or in the event other existing station locations are used (i.e. locations other than those proposed below). Station location information is further discussed above in Section B.1.

B2.3 Media Sampling

Sixty two sample locations that include subsurface soil, groundwater, surface water sediment, effluent, and waste will be collected during this investigation plus QA/QC samples. Sampling efforts will be concentrated in the Flat Creek, Nylon Branch, Nolichucky River, and source areas including the Mercury Manometer and Waste Water Treatment Plant. Sampling methods to be used will be decided in the field, but may include a hand trowel, hand auger device, DPT rig, ponar depending on site specific conditions. All sampling will be in accordance with the Quality System and Technical Procedures for SESD Field Branches including, but not limited to, the following:



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SESDPROC-500-R3 Fluvial Sediment Sampling
SESDPROC-200-R3 Sediment Sampling
SESDPROC-300-R3 Soil Sampling
SESDPROC-305-R3 Potable Water Supply Sampling
SESDPROC-201-R3 Surface Water Sampling
SESDPROC-200-R3 Sediment Sampling
SESDPROC302-R3 Waste Sampling

B2.4 Investigation Derived Waste

IDW generated during ground water sampling activities will be managed in accordance with SESDPROC-202-R3 Management of Investigation Derived Waste dated July 3, 2014. Tetra Tech will procure for the sampling and disposal of IDW. IDW management will be further described by Tetra Tech and provided to the EPA under separate cover.

B2.5 Global Positioning System (GPS) Coordinate Information

Global positioning system (GPS) coordinate information will be obtained at all station locations for inclusion of this information in the SCRIBE database and ultimately to provide electronic data deliverable (EDD) information to USEPA Region 4. GPS coordinates will be obtained in general accordance with SESDPROC-110-R4 (June 23, 2015). As indicated in SESDPROC-110-R3, the desired accuracy for the coordinates of environmental sample locations (soil borings) is 3-5 m. All coordinate information will be obtained and reported in decimal degrees, WGS84 datum.

B2.6 Personnel and Equipment

Key Personnel:

Erin Sutton, TDEC-DoR: Project Management, Report Preparation, and Sample Collection.

Erin Sutton will be responsible for overall project management including authorship of the Phase II ESI QAPP and Phase II ESI Report, procurement of soil and ground water sample containers (see below), sample collection, oversight and/or collection of Global Positioning System (GPS) coordinates for all sample locations, managing the samples using the EPA's Contract Laboratory Program (CLP) procedures, soil and ground water sample quality assurance/quality control (QA/QC), report preparation and coordination of Phase II ESI QAPP and Phase II ESI Report submittal to EPA (John Nolen). She will generate the chain of custody XML files and will upload the files to the sample management office (SMO) portal. The exception is the EPA Science and Ecosystem Support Division – Field Services Branch will handle all aspects of the Nolichucky River sediment and WWTP sediment with corresponding effluent sampling efforts.

Shanda Hunt, TDEC-DOR CLP Specialist: Submittal of Solid and Aqueous Analytical Requests to EPA Region 4; Solid and Aqueous Sample Container Procurement and Preparation; Coordination of Container and Trip Blank Delivery to Erin Sutton



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Pat Gribben, Lee Barron, and/or Justin Fisher, TDEC-DoR: Field Assistance

Given the scope of sampling activities proposed in this QAPP, assistance from additional TDEC-DoR staff may be needed during this field event. Additional field sampling team members may include Pat Gribben, Lee Barron, and/or Justin Fisher. Their assistance may be needed to assist with coordination of field activities, preparation for field activities, TDEC-DoR Global Positioning System (GPS) unit operation, sample collection, and/or field activity documentation (i.e. completion of field notes and/or photo logs).

Tetra Tech (EPA HRS contractor), staff to be determined (will include a PG): QAPP Technical Review, Health and Safety Plan (HASP) Authorship, and Phase II ESI Field Event Technical Assistance.

Phase II ESI field event technical assistance will include the following: Phase II ESI field event health and safety oversight, procurement of sub-contractors (geophysical survey, drilling, etc), sample collection, procuring a portion of the sampling equipment (as described below), assisting with operation of sampling equipment (boat, augur, etc.), providing drums and managing investigation derived waste (IDW), and overseeing and/or assisting with decontamination activities.

EPA Science and Ecosystem Support Division – Field Services Branch, staff to be determined (will include a PG): Nolichucky River Sampling QAPP and collection of sediment core samples.

Phase II ESI field event technical assistance for sampling the Nolichucky River sediment, Waste Water Treatment pond sediment and effluent activities include the following: supplying and operating boat mounted drill rig capable of obtaining sediment core samples, procurement of solid and aqueous sample containers (see below), collection of Global Positioning System (GPS) coordinates for all Nolichucky River sample locations, managing the samples using SESD procedures, sample quality assurance/quality control (QA/QC), SCRIBE database management, sample processing, label generation, sample shipment, documentation of field activities, and completing and/or approving the final core logs for the event.

Equipment to be utilized for this sampling effort:

TDEC-DoR Provided Equipment:

30-gallon hefty trash bags

Approx. 30 cu. Ft. Ice (KFO Ice Machine)

20 Rubbermaid 40-quart ice chests

20 One gallon freezer bags

50 Two gallon freezer bags

Sellstorm 690 sell-gard hard hats (ea)

1 roll aluminum foil

3 roll EPA sample seals

2 boxes Nitrile gloves

1 Garmin GPSMAP 76C GPS



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1 Nikon S50C (S/N 30006230) Cool-Pix Camera

6 rolls paper towels

Log book(s)

Bubble wrap

Packing tape

Temperature control blanks

First aid kit

Pens and Sharpies

Sample Bottles

Tetra Tech Provided Equipment:

MultiRAE

PID

Stainless steel hand augers

Stainless steel bowls and trowels

Alconox

Distilled water

Deionized (DI) water

Spray bottles

Teflon wash bottles

Scrub brushes

Five-gallon buckets

Folding tables

Log book(s)

Camera

Nitrile gloves

Safety glasses

Ear plugs

First aid kit

Pens and Sharpies

Boat for sampling ponds

Petite ponar

Rope

Sludge Judge Sampler or equivalent

DPT/Geoprobe

Sampling for this project is expected to be completed in approximately one week. The EPA will obtain access to the sampling locations. Fewer samples may be analyzed than currently proposed in the QAPP, pending access to properties. The map with the **Route to the Nearest Hospital** is attached. Restaurants and restrooms are available near the site.



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B2.7 Standard Sample Coding

Water Samples

PW - Private Well
PB - Public (Municipal) Well
MW - Monitoring (Permanent) Well
TW - Temporary (Well Point) Well
IW - Industrial Well
SW - Surface Water
SP - Spring Water
LW - Leachate Water
RW - Rinse Water Blank
TW - Trip Blank Water

Soil Samples

SS - Surface Soil
SB - Subsurface Soil
SZ - Saturation Zone
SD - Sediment
SL - Sludge
CS - Composite Soil
LS - Leachate Soil
TS - Trip Blank Soil

Other Codes

IA - Indoor
Air
IAP - Indoor Air
Passive Diffusion
Sampler
AA - Ambient Air
AAP - Ambient Air
Passive Diffusion
Sampler
SG - Active Soil Gas
PSG - Passive Soil Gas
WA - Waste
DR - Drum
QS - Quality Control
TA - Trip Blank Air
D - Duplicate

All sample codes will consist of at least ten characters in the following format:

*Site Name (Abbreviation) and Sample Number, Date (month and year), and sample type

Example: Liberty Fibers (LF), first subsurface soil sample collected at station location five (LF05)

Appropriate Code: LF05-0319SB

The first ten characters will be in this format; if additional identification for a particular sampling location is needed, a suffix will be added. All samples placed in an individual geographic location will have a unique identification number (Station ID). In the example above LF05 represents the Station ID. This allows DoR to collect additional samples from the same Station ID at a later date, if needed.

B3. Sample Handling and Custody

Subsurface soil samples will be collected as described in Section B2.4. Ground water samples will be collected as described in Section B2.5.3. Soil gas samples will be collected as described in Section B2.6. All samples will be handled and custody maintained in accordance with the SESD Operating Procedure for Sample Evidence Management, SESDPROC-005-R2 (January 29, 2013). Samples will remain in the custody of the sampling team until they are shipped to the Regional Laboratory and/or a CLP Laboratory for analysis.



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B4. Analytical Methods

Solid and aqueous samples will be sent to either the EPA Regional Laboratory or a CLP Laboratory. Solid sediment and soil samples will be

Solid Samples:

Semi-volatiles and PCBs: SOM02.4 EPA Methods SW-846 8270D & 8082A
Inorganics w/Mercury: ISM02.4 EPA Method SW-846 6020B

Waste and Mercury Manometer Solid Samples:

Semi-volatiles and PCBs: SOM02.4 EPA Methods SW-846 8270D & 8082A
Inorganics w/Mercury: ISM02.4 EPA Method SW-846 6020B
TCLP inorganics w/ Hg ISM02.4 EPA Methods SW-846 7471B & 6010D
Volatile organics: SOM02.2 EPA Method 8260C (clarifier only)

Aqueous Samples:

Semi-volatiles and PCBs: SOM02.4 EPA Methods SW-846 8270D & 8082A
Inorganics w/Mercury: ISM02.4 EPA Methods SW-846 7470A & 200.8

Analytical Support Branch, Laboratory Operations and Quality Assurance Manual (ASBLOQAM) www.epa.gov/regionallabs/epa-region-4-analytical-support-branch-laboratory-operations-and-quality-assurance

Superfund Analytical Services and Contract Laboratory Program www.epa.gov/clp

B5. Quality Control

Laboratory:

Soil and ground water samples will be analyzed by either the EPA Region 4 SESD laboratory or a CLP Laboratory. All laboratory analyses and laboratory QA procedures used during this inspection will be in accordance with standard procedures and protocols as specified in the Analytical Support Branch Laboratory Operations and Quality Assurance Manual; USEPA, Region 4, Science and Ecosystem Support Division; most recent version or specified by the existing EPA standard procedures and protocols for the contract analytical laboratory program.

Field:

Solid and aqueous samples will be preserved with ice. Aqueous samples for metals analysis shall also be preserved with nitric acid to a pH below 2. All samples will be managed according to SESD Operating Procedure for Sample Evidence Management, SESDPROC-005-R2.



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Samples will remain in the custody of the sampling team until they are prepared for shipment to the Regional Laboratory or CLP Laboratory for analysis. Shanda Hunt, the DoR CLP Specialist, will coordinate with EPA Laboratory personnel. Erin Sutton will process the samples (excluding the Nolichucky River and WWTP Effluent), which includes preparing the chains of custody based on the information collected in the field about the respective samples. Erin Sutton will pack the coolers and deliver them to a Federal Express hub for overnight shipment to the Regional Laboratory or CLP Laboratory.

All samples will be handled and custody maintained according to the following:

SESD Analytical Support Branch Laboratory Operations and Quality Assurance Manual, most recent version (April 24, 2018).

SESD Operating Procedure for Sample and Evidence Management, SESDPROC-005-R2 (January 29, 2013).

SESD Operating Procedure for Packing, Labeling and Shipping of Environmental and Waste Samples, SESDPROC-209-R3 (February 4, 2015).

Sample locations are shown on Addendum D and sample location rationale is provided in Section B1.

Specific quality assurance samples will be collected as part of this effort, as discussed below. The rationale and number of samples is based upon SOPs as identified in SESDPROC-011-R5, Field Sampling Quality Control (April 26, 2017).

Background Samples

Background samples are collected from areas suspected to be upgradient and/or away from known or suspected areas of contamination. Background samples are used to determine the presence of contamination that may not be site related and assess site-attributable contamination by comparing the background results to the site-specific data. Background samples are collected for sediment and subsurface soil samples. One background subsurface soil sample and two background sediment samples are proposed for collection. The proposed background subsurface soil will be determined in the field (LF45), a proposed background sediment location for Flat Creek (LF56) is approximately 2000-feet upstream of Outfall 005, and the background Nolichucky River sample location is approximately 500-feet upstream of the WWTP effluent discharge dam.

Duplicate Samples

Duplicate samples are two or more samples collected at different times or locations in order to evaluate the spatial or temporal variability of a matrix. The samples are placed into separate containers but are from the same source matrix. Per SESDPROC-011-R5, no more than 10% of samples should be collected as duplicates. Therefore, DoR will collect duplicate samples at rate of 3%. DoR intends to collect up to 42 sediment, 11 effluent/waste, 8 subsurface soil, and 1



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private well samples. Therefore, DoR will collect two sediment, 1 subsurface soil, and 1 waste duplicate samples. Duplicate sample locations are identified in Section B.1. Fewer samples may be collected and analyzed than currently proposed in the QAPP, pending access agreements. Duplicate locations are also subject to change, pending access agreements. Deviations from the QAPP will be documented.

Split Samples

Split samples are prepared by collecting twice as much volume at a designated sample location. Both containers are sent to the laboratory for analysis, with one identified as the sample and the other identified as the split. Split samples are typically collected at a rate of 5-10% of samples from applicable matrices at a site. The purpose of the sample is to evaluate sample handling variability. Groundwater is the only matrix for which a split sample will be collected. One groundwater private well sample is proposed for collection. Therefore, one split soil gas split sample will be collected.

Trip Blanks

The purpose of a trip blank is to help determine if samples have been exposed to VOC contaminants other than what may be within the individual sample(s) itself. Trip blanks are kept with the investigative samples throughout the sampling event and are packaged and shipped to the laboratory with the investigative samples. A trip blank is needed per media for each shipment of VOC samples. Since VOC analysis is not proposed for this sampling event no trip blanks are proposed for this sampling event.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to assess the effectiveness of decontamination procedures by collecting organic-free water poured over equipment after it has been decontaminated. Equipment rinsate blanks are collected at a frequency of one per sampling event per type of sampling tool used. In order to evaluate the effectiveness of decontamination procedures associated with soil, waste, and sediment sampling activities, DoR is proposing to collect three rinsate blanks.

Matrix Spike and Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples are additional quantities of a sample from a single sampling location that are provided to the lab for spiking with known compounds at known concentrations. The spiked samples are analyzed and the result indicates the amount of interference posed by the matrix that either reduces or adds to the known concentration. One set of MS/MSD samples are typically collected per 20 or fewer samples per matrix. Three MS/MSD sediment samples, one MS/MSD subsurface soil, one MS/MSD waste TCLP, and one MS/MSD aqueous sample will be collected for this event.



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Preservative Blanks

Preservative blanks are sample containers pre-filled with organic-free water that are preserved in the field with the preservative being utilized for the sampling effort. One blank sample is typically collected for each type of preservative used and from each new container of preservative used. The aqueous samples will be preserved with nitric acid with a preservative blank analysis previously obtained.

Section B.1 provides QA/QC sample locations and rationale. The table below provides the recommended sample container requirements, preservation, and holding time criteria for samples analyzed by the Regional Laboratory and CLP Laboratory.



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Analytical Methodology, Containers, Holding Times, and Preservatives

Analysis	Container Type	Preservative	Holding Time	Number of Samples	Field Duplicates/Split	MS/MSD ³	Rinsate Blank (water only)	Total Number of samples (include trips & dups)	Total Number of Containers (includes MS/MSD)
Solid Matrix –SOM02.4 EPA methods SW-846 8270D & 8082A (semi-volatiles & aroclors)	1-8 oz glass jar per sample	Ice to 4°C	10 days	46	4	3	0	50	50
Aqueous Matrix – SOM02.4 EPA methods SW-846 8270D & 8082A (semi-volatiles & aroclors)	4 1L amber glass bottles	Ice to 4°C	5 days	8	1	1	3	12	52
Solid Matrix –ISM02.4 EPA methods SW-846 6020B (inorganics w/ Hg)	1-8 oz glass jar per sample	Ice to 4°C	10 days	46	4	3	0	50	50
Solid Matrix –ISM02.4 EPA methods SW-846 7471B & 6010D (TCLP inorganics w/ Hg)	1-8 oz glass jar per sample	Ice to 4°C	26 days	9	1	1	0	10	10
Aqueous Matrix – ISM02.4 EPA methods SW-846 7470A & 200.8 (inorganics w/ Hg)	1-1L poly	Nitric Acid pH below 2	26 days	8	1	1	3	12	12



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B6. Instrument/Equipment Testing, Inspection and Maintenance

Tetra Tech shall detail instrument and equipment testing, inspection and maintenance information under separate cover. See section B2 for supplies.

See also the *State of Tennessee Program-Level Quality Assurance Project Plan for Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreements*.

B7. Instrument/Equipment Calibration and Frequency

Tetra Tech shall supply all required instruments and will detail calibration requirements and frequency under separate cover.

Also see the *State of Tennessee Program-Level Quality Assurance Project Plan for Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreement*.

B8. Inspection/Acceptance for Supplies and Consumables

All critical supplies and consumables (gloves, bags, seals, etc.) for this field investigation will be inspected prior to field activities commencing. DoR purchases only sample containers that meet or exceed Table 2 in EPA's "Specifications and guidance for contaminant free sample containers" (EPA publication A540/R-93/051). DoR receives and files the certification sheet for every case of bottles. Items such as gloves, bags and seals will be checked that they are clean and undamaged and in new condition. No field decontamination of consumable equipment is anticipated. If decontamination is required all operations will be conducted consistent with *SESD Operating Procedure for Field Equipment Cleaning and Decontamination, SESDPROC-205-R3*

Also see the *State of Tennessee Program-Level Quality Assurance Project Plan for Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreements*.

The individuals responsible for ensuring that these requirements are met are: DoR Knoxville Field Office personnel; Project Manager Erin Sutton.

B9. Non-direct Measurements:

Optional (Applicability of this item is site-specific).

B10. Data Management

The project manager, Erin Sutton, will be responsible for ensuring that all requirements for data management are met. All data generated for this field investigation, whether hand-recorded or



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obtained using an electronic data logger, will be recorded, stored, and managed according to the following procedures using the SCRIBE software package:

SESD Operating Procedure for Control of Records, SESDPROC-002-R6 (October 23, 2014).
SESD Operating Procedures for Logbooks, SESDPROC-010-R5 (May 30, 2013).

All data generated by the Pre-Remedial program becomes part of the specific site file and becomes a reference for the final inspection report. Analytical results are received electronically from EPA SESD, and are stored on the Project Manager's personal computer. Upon completion of the site report, all computer files are copied to CD and labeled with the site ID # and placed in the corresponding site file in both the field office and the central office. Reports are delivered to EPA in electronic form via designated EPA portal, e-mail or on writeable CD or DVD depending on final report package size. File types that are generally produced for DoR reports are as follows:

- Microsoft Word Narratives, Reports, or Checklists
- ESRI ArcMap Shape Files containing GIS information
- Digital pictures from site recons or sampling
- Microsoft Excel data files
- Adobe .pdf files of analytical data and complete submitted report packages
- HRS Quickscore files

TDEC currently replaces personal computers on an approximate three-year cycle, depending on available funding. With the various applications (ArcMap, etc.) necessary for production of our reports, DoR Pre-Remedial EPMs are outfitted with appropriate computers and all required software.

The Office of Open Records Counsel ensures compliance and consistency within state government with the State of Tennessee Open Records Act, TCA 10-7-503. DoR is responsible for handling all requests for access to DoR files from the public, and distributes records and information according to the open records act. Draft HRS scores are not released to the public until a site is listed on the NPL or given a NFRAP status by EPA.

SECTION C: Assessment/Oversight

C1. Assessments and Response Actions

Support Information:

The Project Manager/QA Officer (Erin Sutton) has overall responsibility for supervising and ensuring that samples are collected and handled in accordance with this QAPP and that the documentation of field activities is adequate and complete. Ms. Sutton will evaluate the implementation of the QAPP on a day-to-day basis. Field activities such as sample collection, preservation, and labeling will be checked for completeness. When procedures are found to be



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out of compliance with the QAPP, the deviation will be documented in the field logbook and corrective action taken.

The Regional Laboratory or CLP Laboratory and EPA QA section will be responsible for evaluating and validating the soil and ground water data and will prepare a Data Review and Validation Report of the project data to be included in the final report. If a discrepancy occurs at any point during the analytical process, corrective action will be taken to resolve the problems as quickly as possible and to bring the system into compliance with the projects QA requirements. This applies to both field and laboratory activities.

The laboratory has a corrective action system in place that operates under the direction of the laboratory's Quality Assurance Officer. The lab's QA Officer or the Officer's designee shall be responsible for initiating corrective actions as necessary. Corrective actions will be required if there are any discrepancies noted upon receipt of the samples by the laboratory. Corrective actions will also be required if any QC samples or laboratory conditions fail to meet method-specific criteria or criteria described in the laboratory's QA plan.

Assessments will be conducted during the field investigation according to the SESD Operating Procedure for Project Planning, SESDPROC-016-R5 (March 31, 2016) to ensure the QAPP is being implemented as approved. The Project Manager is responsible for all corrective actions while in the field.

Also see the *State of Tennessee Program-Level Quality Assurance Project Plan for Pre-Remedial Sampling Inspections Performed under EPA/State Cooperative Agreements*.

C2. Reports to Management/Support Information

Written progress reports will be sent to the Project Technical Manager (Dana Ohren) on a quarterly basis. Any problems that may develop will be brought to the attention of Ms. Ohren and Christina McNaughton (East Tennessee Regional Manager). This notification will be documented in the field logs. It shall be the responsibility of these persons to notify the EPA Project Manager. The impact of these problems will be discussed with EPA. Results of these discussions will be summarized in the final report.

The Phase II Expanded Site Inspection Report shall include:

- Site History/project background,
- Description of field sampling design,
- Description of all fieldwork,
- All investigative findings,
- Summary of QA/QC and any impacts to the project,
- Comparison of the data to detection limits, background, and SCDM benchmarks or applicable regulatory screening levels
- Evaluation of the target population utilizing HRS Quick Score,



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Conclusion of study findings, and

Appendices with all field notes, photographic logs, sample forms, sample location maps, well logs, boring logs, chains of custody, and laboratory analytical data.

Erin Sutton shall prepare the QA/QC summary section of the report. It shall be the responsibility of Ms. Sutton to review the assessment report to ensure the data is being interpreted properly before it is released for general review.

Ms. Sutton will be responsible for notifying the EPA Project Manager if any circumstances arise during the field investigation that may adversely impact the quality of the data collected.

SECTION D: Data Validation and Usability

D1. Data Review, Verification, and Validation:

Raw data and QA/QC data will be reviewed upon receipt of results from the Regional or CLP Laboratory. Every attempt will be made to verify and validate the data upon receipt. An inspection of blank and duplicate samples will be conducted and compared with DQO objectives and procedures contained in EPA Guidance (see below). All data review, verification and validation will be in accordance with Field Branches Quality System and Technical Procedures, Region 4 Science and Ecosystem Support Division (SESD), Athens, GA. U.S.E.P.A., most recent version (Reference 24).

Flagged data will be evaluated to determine the suitability of inclusion in the data set. Flagged data will not be used unilaterally to make site decisions or score the site. Evaluation of flagged data will be conducted in compliance with EPA SOPs, including Analytical Support Branch Laboratory Operations and Quality Assurance Manual. Region 4 SESD, Athens, GA, most recent version.

D2. Verification and Validation Methods

The Project Manager will be responsible for validating the data. An extensive examination of the laboratory QA documentation and the sample results will be conducted to verify that data accurately reflects site conditions. Please see above discussion (Section B) for methods and references to be used.



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D3. Reconciliation with User Requirements

All sample results including data anomalies, field duplicates, blanks, and background samples will be evaluated by the project manager to assure data quality. Should problems arise, the Field Operations Director, (Merrie Embry) will be notified and appropriate measures will be taken to assure questionable data are not used in the decision making process. All reconciliation will be conducted in accordance with the EPA guidance specified in D1.

**Footnotes: This Quality Assurance Project Plan (QAPP) has been prepared and approved according to the EPA Requirements for Quality Assurance Project Plans (EPA QA/R5 EPA/240/B-01/003), U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC, March 2001(USEPA, 2001). This document will be used to ensure that the environmental data collected for this project are of the type and quality for the intended purposes.

Addendum A

Organizational Charts

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Director Division of Remediation
Env Prg Admin, *Chris Thompson*
615-532-8599

00105954 Environmental Fellow,
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615-532-0911

Deputy Director for Central Office Operations
00072315 EPD, *Robin Heriges*, 615-741-4936

00079169 ENCN4, (Vacant)
00078164 ENCN4, *Evan Spann*, 615-532-0919
00109346 ENCN3, *Charles Rowan*, 615-532-7823
00042186 ENCN3, *Ashley Pulley*, 615-532-0923

Deputy Director of DOE/O Oak
Ridge Colby Morgan
See DOR Oak Ridge Office

Deputy Director of Field Operations
00109345 EPD, *Ahmet Bulbulkaya*, 615-532-0227

00074020 ENMG4, *Vacant*, 615-532-0908

00072895 ENCN2, (Vacant)
00103922 ENCN2, *Justin Meredith*, 615-532-9304
00078165 ENCN1, *Paula Middlebrooks*, 615-532-0926
00109333 ENCN1, *Alison Hensley*, 615-532-0932
00068632 ENCN2, *Charles Jobe*, 615-532-0463
00068440 ENSC3, *Shannon Gray*, 615-532-0910
00072296 ENCN2, (Vacant)

00068461 ASM
Genevia Guillory-Coward
615-253-3876

00074023 ENMG3, *Jordan English*, 901-371-3039 (West)

00109293 ENCN3, *Merrie Embry*, 901-371-3151
00079160 ENCN2, *Betty Maness*, 731-512-1331
00104030 ENCN1, *Jamie Woods*, 901-371-3041
00102774 ENCN1, *Don Sprinkle*, 731-512-1328
00108033 ENSC3, *Alison Campany*, 901-371-3040
00072312 ENSC2, *Jason Morat*, 901-371-3168
00102775 ENSC2, *Shanda Hunt*, 731-512-1326
00115068 ENSC2, (Vacant), 731-512-1323
00074017 ENSC3, (Vacant)
00108031 EPS2, (Vacant), 901-371-3042

00079164 ENMG3, *Ken Johnson*, 615-687-7032 (Middle)

00074026 ENCN1, *John Hoffelt*, 615-687-7067
00104210 ENSC3, *Rebecca Shoffeitt*, 615-687-7063
00072297 EPS2, *Cameron Swanson*, 615-687-7069
00074019 ENSC3, *Chris Seifert*, 615-687-7065
00074018 ENCN2, (Vacant) 615-532-0910
00106870 ENSC2, (Vacant)
00108028 ENCN3, (Vacant)

00072300 ENMG3, *Chrissy McNaughton*, 865-594-5445 (East)

00074015 ENMG4, *Robert Wilkinson* **

00072295 ENCN3, *Troy Keith*, 423-634-5755
00086125 ENCN3, *Chris Andel*, 865-594-5444
00079170 ENCN3, *Erin Sutton*, 865-594-5480
00078163 ENCN1, *Lee Barron*, 865-594-5482
00109295 ENSC3, *Justin Fisher*, 865-594-5466
00109291 ENSC3, (Vacant) 423-854-5469
00074022 ENSC2, (Vacant)
00074074 ENMG1, (Vacant)

Addendum B
Sample Parameters

Methods, Preservation, and Hold Times Table

US-EPA Contract Laboratory Program Target Compounds and Analytes:

SOM01.2 Volatile Target Compound List and Corresponding CRQLs

SOM01.2 Pesticides/Aroclors Target Compound List and Corresponding CRQLs

SOM01.2 Semivolatile Target Compound List and Corresponding CRQLs

ILM05.3/ILM05.4 Metals and Cyanide Target Analyte List and Corresponding CRQLs

DLM02.0 Dioxins and Furans Target Compound List and Corresponding CRQLs

Screening Criteria:

RSL Table

Region 4 Ecological Screening Values

NOAA Alternate Screening Tables

SOM01.2 Volatile Target Compound List and Corresponding CRQLs

COMPOUND	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
	Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Dichlorodifluoromethane	--	0.5	5	5	250
<u>Chloromethane</u>	--	0.5	5	5	250
Vinyl chloride	--	0.5	5	5	250
Bromomethane	--	0.5	5	5	250
Chloroethane	--	0.5	5	5	250
Trichlorofluoromethane	--	0.5	5	5	250
<u>1,1-Dichloroethene</u>	--	0.5	5	5	250
1,1,2-Trichloro-1,2,2-trifluoroethane	--	0.5	5	5	250
Acetone	--	5	10	10	500
<u>Carbon disulfide</u>	--	0.5	5	5	250
Methyl acetate	--	0.5	5	5	250
<u>Methylene chloride</u>	--	0.5	5	5	250
trans-1,2-Dichloroethene	--	0.5	5	5	250
<u>Methyl tert-butyl ether</u>	--	0.5	5	5	250
<u>1,1-Dichloroethane</u>	--	0.5	5	5	250
<u>cis-1,2-Dichloroethene</u>	--	0.5	5	5	250
2-Butanone	--	5	10	10	500
Bromochloromethane	--	0.5	5	5	250
Chloroform	--	0.5	5	5	250
<u>1,1,1-Trichloroethane</u>	--	0.5	5	5	250
Cyclohexane	--	0.5	5	5	250
Carbon tetrachloride	--	0.5	5	5	250
Benzene	--	0.5	5	5	250
<u>1,2-Dichloroethane</u>	--	0.5	5	5	250
1,4-Dioxane	--	--	100	100	5000
<u>Trichloroethene</u>	--	0.5	5	5	250
Methylcyclohexane	--	0.5	5	5	250
<u>1,2-Dichloropropane</u>	--	0.5	5	5	250
<u>Bromodichloromethane</u>	--	0.5	5	5	250
<u>cis-1,3-Dichloropropene</u>	--	0.5	5	5	250
4-Methyl-2-pentanone	--	5	10	10	500
<u>Toluene</u>	--	0.5	5	5	250
<u>trans-1,3-Dichloropropene</u>	--	0.5	5	5	250
<u>1,1,2-Trichloroethane</u>	--	0.5	5	5	250

CONTINUED
SOM01.2 Volatile Target Compound List and Corresponding CRQLs

COMPOUND	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
	Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Tetrachloroethene	--	0.5	5	5	250
2-Hexanone	--	5	10	10	500
Dibromochloromethane	--	0.5	5	5	250
1,2-Dibromoethane	0.05	0.5	5	5	250
Chlorobenzene	--	0.5	5	5	250
Ethylbenzene	--	0.5	5	5	250
o-Xylene	--	0.5	5	5	250
m,p-Xylene	--	0.5	5	5	250
Styrene	--	0.5	5	5	250
Bromoform	--	0.5	5	5	250
Isopropylbenzene	--	0.5	5	5	250
1,1,2,2-Tetrachloroethane	--	0.5	5	5	250
1,3-Dichlorobenzene	--	0.5	5	5	250
1,4-Dichlorobenzene	--	0.5	5	5	250
1,2-Dichlorobenzene	--	0.5	5	5	250
1,2-Dibromo-3-chloropropane	0.05	0.5	5	5	250
1,2,4-Trichlorobenzene	--	0.5	5	5	250
1,2,3-Trichlorobenzene	--	0.5	5	5	250

SOM01.2 Pesticides/Aroclors Target Compound List and Corresponding CRQLs

COMPOUND	SOM01.2	
	CONTRACT REQUIRED	
	QUANTITATION LIMITS	
	Water (ug/L)	Soil (ug/Kg)
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC (Lindane)	0.05	1.7
<u>Heptachlor</u>	0.05	1.7
Aldrin	0.05	1.7
<u>Heptachlor epoxide</u>	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.1	3.3
4,4'-DDE	0.1	3.3
Endrin	0.1	3.3
Endosulfan II	0.1	3.3
4,4'-DDD	0.1	3.3
Endosulfan sulfate	0.1	3.3
4,4'-DDT	0.1	3.3
Methoxychlor	0.5	17
Endrin ketone	0.1	3.3
<u>Endrin aldehyde</u>	0.1	3.3
alpha-Chlordane	0.05	1.7
gamma-Chlordane	0.05	1.7
Toxaphene	5	170
Aroclor-1016	1	33
Aroclor-1221	1	33
Aroclor-1232	1	33
Aroclor-1242	1	33
Aroclor-1248	1	33
Aroclor-1254	1	33
Aroclor-1260	1	33
Aroclor-1262	1	33
Aroclor-1268	1	33

SOM01.2 Semivolatile Target Compound List and Corresponding CRQLs

COMPOUND	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
	Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Benzaldehyde	--	5	--	170	5,000
Phenol	--	5	--	170	5,000
Bis(2-chloroethyl) ether	--	5	--	170	5,000
2-Chlorophenol	--	5	--	170	5,000
2-Methylphenol	--	5	--	170	5,000
2,2'-Oxybis(1-choloropropane)	--	5	--	170	5,000
Acetophenone	--	5	--	170	5,000
4-Methylphenol	--	5	--	170	5,000
N-Nitroso-di-n propylamine	--	5	--	170	5,000
Hexachloroethane	--	5	--	170	5,000
Nitrobenzene	--	5	--	170	5,000
Isophorone	--	5	--	170	5,000
2-Nitrophenol	--	5	--	170	5,000
2,4-Dimethylphenol	--	5	--	170	5,000
Bis(2-chloroethoxy) methane	--	5	--	170	5,000
2,4-Dichlorophenol	--	5	--	170	5,000
Naphthalene	0.1	5	3.3	170	5,000
4-Chloroaniline	--	5	--	170	5,000
Hexachlorobutadiene	--	5	--	170	5,000
Caprolactam	--	5	--	170	5,000
4-Chloro-3-methylphenol	--	5	--	170	5,000
2-Methylnaphthalene	0.1	5	3.3	170	5,000
Hexachlorocyclopentadiene	--	5	--	170	5,000
2,4,6-Trichlorophenol	--	5	--	170	5,000
2,4,5-Trichlorophenol	--	5	--	170	5,000
1,1'-Biphenyl	--	5	--	170	5,000
2-Chloronaphthalene	--	5	--	170	5,000
2-Nitroaniline	--	10	--	330	10,000
Dimethylphthalate	--	5	--	170	5,000
2,6-Dinitrotoluene	--	5	--	170	5,000
Acenaphthylene	0.1	5	3.3	170	5,000
3-Nitroaniline	--	10	--	330	10,000
Acenaphthene	0.1	5	3.3	170	5,000
2,4-Dinitrophenol	--	10	--	330	10,000
4-Nitrophenol	--	10	--	330	10,000

CONTINUED
SOM01.2 Semivolatile Target Compound List and Corresponding CRQLs

COMPOUND	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
	Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Dibenzofuran	--	5	--	170	5,000
2,4-Dinitrotoluene	--	5	--	170	5,000
Diethylphthalate	--	5	--	170	5,000
Fluorene	0.1	5	3.3	170	5,000
4-Chlorophenyl-phenyl ether	--	5	--	170	5,000
4-Nitroaniline	--	10	--	330	10,000
4,6-Dinitro-2-methylphenol	--	10	--	330	10,000
N-Nitrosodiphenylamine	--	5	--	170	5,000
1,2,4,5-Tetrachlorobenzene	--	5	--	170	5,000
4-Bromophenyl-phenylether	--	5	--	170	5,000
Hexachlorobenzene	--	5	--	170	5,000
Atrazine	--	5	--	170	5,000
Pentachlorophenol	0.2	10	6.7	330	10,000
Phenanthrene	0.1	5	3.3	170	5,000
Anthracene	0.1	5	3.3	170	5,000
Carbazole	--	5	--	170	5,000
Di-n-butylphthalate	--	5	--	170	5,000
Fluoranthene	0.1	5	3.3	170	5,000
Pyrene	0.1	5	3.3	170	5,000
Butylbenzylphthalate	--	5	--	170	5,000
3,3'-dicholorobenzidine	--	5	--	170	5,000
Benzo(a)anthracene	0.1	5	3.3	170	5,000
Chrysene	0.1	5	3.3	170	5,000
Bis(2-ethylhexyl) phthalate	--	5	--	170	5,000
Di-n-octylphthalate	--	5	--	170	5,000
Benzo(b) fluoranthene	0.1	5	3.3	170	5,000
Benzo(k) fluoranthene	0.1	5	3.3	170	5,000
Benzo(a) pyrene	0.1	5	3.3	170	5,000
Indeno(1,2,3,-cd) pyrene	0.1	5	3.3	170	5,000
Dibenzo(a,h) anthracene	0.1	5	3.3	170	5,000
Benzo(g,h,i) perylene	0.1	5	3.3	170	5,000
2,3,4,6-Tetrachlorophenol	--	5	--	170	5,000

ILM05.3/ILM05.4 Metals and Cyanide Target Analyte List and Corresponding CRQLs

ANALYTES	CONTRACT REQUIRED QUANTITATION LIMITS		
	ICP-AES	ICP-AES	ICP-MS
	Water (ug/L)	Soil (mg/kg)	Water (ug/L)
Aluminum	200	20	--
Antimony	60	6	2
Arsenic	10	1	1
Barium	200	20	10
Beryllium	5	0.5	1
Cadmium	5	0.5	1
Calcium	5000	500	--
Chromium	10	1	2
Cobalt	50	5	1
Copper	25	2.5	2
Iron	100	10	--
Lead	10	1	1
Magnesium	5000	500	--
Manganese	15	1.5	1
Mercury	0.2	0.1	--
Nickel	40	4	1
Potassium	5000	500	--
Selenium	35	3.5	5
Silver	10	1	1
Sodium	5000	500	--
Thallium	25	2.5	1
Vanadium	50	5	1*
Zinc	60	6	2
Cyanide	10	2.5	--

DLM02.0 Dioxins and Furans Target Compound List and Corresponding CRQLs		
CDD/CDF	Water (pg/L)	Solids (ng/kg)
2378-TCDD	10	1.0
12378-PeCDD	50	5.0
123678-HxCDD	50	5.0
123478-HxCDD	50	5.0
123789-HxCDD	50	5.0
1234678-HpCDD	50	5.0
OCDD	100	10
2378-TCDF	10	1.0
12378-PeCDF	50	5.0
23478-PeCDF	50	5.0
123678-HxCDF	50	5.0
123789-HxCDF	50	5.0
123478-HxCDF	50	5.0
1234678-HxCDF	50	5.0
1234678-HpCDF	50	5.0
1234789-HpCDF	50	5.0
OCDF	100	10

Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) May 2018

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice); c = cancer; n = noncancer; * = where n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide)																								
Toxicity and Chemical-specific Information								Contaminant			Screening Levels							SSLs						
SFO (mg/kg-day) ⁻¹	k _e	IUR (ug/m ³) ⁻¹ y	k _e	RD _o (mg/kg-day)	k _e	RfC _i (mg/m ³)	k _v	c _{eo}	muta-	GIAB S	ABS	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)		
2.2E-06	I	9.0E-03	I	V	1	0.1	#####	Acephate	30560-19-1	7.6E+01	n	9.8E+02	n				2.4E+01	n	5.3E-03	n				
2.0E-02	I	1	0.1	#####	Acetaldehyde	75-07-0	1.1E+01	c**	4.9E+01	c*	1.3E+00	c**	5.6E+00	c**	2.6E+00	c**	3.5E+02	n	5.2E-04	c**				
					Acetochlor	34256-82-1	1.3E+03	n	1.6E+04	n									2.8E-01	n				
9.0E-01	I	3.1E+01	A	V	1	0.1	#####	Acetone	67-64-1	6.1E+04	n	6.7E+05	s	3.2E+04	n	1.4E+05	n	1.4E+04	n	2.9E+00	n			
2.0E-03	X	2.0E-03	X	1	0.1	#####	Acetone Cyanohydrin	75-85-5	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n			2.6E-02	n				
6.0E-02	I	V	1	#####	Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n								
3.8E+00	C	1.3E-03	C	I	V	1	0.1	#####	Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	s				1.9E+03	n	5.8E-01	n			
5.0E-04	I	2.0E-05	I	V	1	0.1	#####	Acetylaminofluorene, 2-	53-96-3	1.4E-01	c	6.0E-01	c	2.2E-03	c	9.4E-03	c	1.6E-02	c	7.2E-05	c			
					Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n			8.4E-06	n				
5.0E-01	I	1.0E-04	I	2.0E-03	I	M	1	0.1	Acrylic Acid	79-06-1	2.4E-01	c	4.6E+00	c	1.0E-02	c	1.2E-01	c	5.0E-02	c	1.1E-05	c		
5.0E-01	I	1.0E-03	I	1.0E-03	I	V	1	0.1	Acrylonitrile	79-10-7	9.9E+01	n	4.2E+02	n	1.0E+00	n	4.4E+00	n	2.1E+00	n	4.2E-04	n		
5.4E-01	I	6.8E-05	I	4.0E-02	A	2.0E-03	I	V	1	#####	Adiponitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*	1.1E-05	c*
					Adipic Acid	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n										
5.6E-02	C	1.0E-02	I	1	0.1	Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c							2.0E+00		8.7E-04	c	1.6E-03		
1.0E-03	I	1	0.1	Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n								2.0E+01	n	4.9E-03	n	7.5E-04			
1.0E-03	I	1	0.1	Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n								2.0E+01	n	4.4E-03	n	8.8E-04			
					Aldicarb sulfoxide	1646-87-3											4.0E+00							
1.7E+01	I	4.9E-03	I	3.0E-05	I	V	1	0.1	Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c	1.5E-04	c		
2.1E-02	C	6.0E-06	C	5.0E-03	I	V	1	0.1	Allyl Alcohol	107-18-6	3.5E+00	n	1.5E+01	n	1.0E-01	n	4.4E-01	n	2.1E-01	n	4.2E-05	n		
1.0E+00	P	5.0E-03	P	1	0.1	Allyl Chloride	107-05-1	7.2E-01	c*	3.2E+00	c*	4.7E-01	c*	2.0E+00	c*	7.3E-01	c**			2.3E-04	c**	3.0E+04		
					Aluminum	7429-90-5	7.7E+04	n	1.1E+06	nm	5.2E+00	n	2.2E+01	n	2.0E+00	n								
4.0E-04	I	1	0.1	Aluminum Phosphide	20859-73-8	3.1E+01	n	4.7E+02	n								8.0E+00	n						
9.0E-03	I	1	0.1	Ametrine	834-12-8	5.7E+02	n	7.4E+03	n								1.5E+02	n						
					Aminobiphenyl, 4-	92-67-1	2.6E-02	c	1.1E-01	c	4.7E-04	c	2.0E-03	c	3.0E-03	c			1.6E-01	n				
2.1E+01	C	6.0E-03	C	1	0.1	Aminophenol, m-	591-27-5	5.1E+03	n	6.6E+04	n						1.6E+03	n	6.1E-01	n				
4.0E-03	X	4.0E-02	X	1	0.1	Aminophenol, o-	95-55-6	2.5E+02	n	3.3E+03	n						3.0E-02	n						
2.0E-02	P	1	0.1	Aminophenol, p-	123-30-8	1.3E+03	n	1.6E+04	n							4.0E+02	n	1.5E-01	n					
					Amiriz	33089-61-1	1.6E+02	n	2.1E+03	n						8.2E+00	n							
					Ammonia	7664-41-7												4.2E+00	n					
					Ammonium Sulfamate	7773-06-0	1.6E+04	n	2.3E+05	nm	5.2E+02	n	2.2E+03	n										
5.7E-03	I	1.6E-06	C	7.0E-03	P	1.0E-03	I	1	0.1	Amyl Alcohol, tert-	75-85-4	8.2E+01	n	3.4E+02	n	3.1E+00	n	1.3E+00	n	1.3E-03	n			
4.0E-02	P	2.0E-03	X	1	0.1	Aniline	62-53-3	9.5E+01	c*	4.0E+02	c*	1.0E+00	n	4.4E+00	n	1.3E+01	c*			4.6E-03	c*			
					Anthraquinone, 9,10-	94-65-1	1.4E+01	c*	5.7E+01	c*						1.4E+00	c*	1.4E-02	c*					
4.0E-04	I	0.15				Antimony (metallic)	7440-36-0	3.1E+01	n	4.7E+02	n						7.8E+00	n	3.5E-01	n	2.7E-01			
5.0E-04	H	0.15				Antimony Pentoxide	1314-60-9	3.9E+01	n	5.8E+02	n						9.7E+00	n						
4.0E-04	H	0.15				Antimony Tetroxide	1332-81-6	3.1E+01	n	4.7E+02	n						7.8E+00	n						
1.5E+00	I	4.3E-03	I	3.0E-04	I	C	1.5E-05	C	1	0.03	Antimony Trioxide	1309-64-4	1.2E+05	nm	2.1E-01	n	8.8E-01	n						
3.5E-06	3.5E-06	I	V	1	0.1	Arsenic, Inorganic	7440-38-2	6.8E-01	c*	3.0E+00	c*	6.5E-04	c*	2.9E-03	c*	5.2E-02	c			1.0E+01	c	2.9E-01		
2.3E-01	C	3.5E-02	O	V	1	0.1	Arsine	7784-42-1	2.7E-01	n	4.1E+00	n	5.2E-02	n	2.2E-01	n	7.0E-02	c			2.0E-04	c	6.1E-04	
					Asumal	3337-71-1	2.3E+03	n	3.0E+04	n						7.2E+02	n							
2.3E-01	C	3.5E-02	O	V	1	0.1	Atrazine	1912-24-9	2.4E+00	c	1.0E+01	c				3.0E-01	c							
8.8E-01	C	2.5E-04	C	V	1	0.1	Auramine	492-08-0	6.2E-01	c	2.6E+00	c	1.1E-02	c	4.9E-02	c	6.7E-02	c						
1.1E-01	I	3.1E-05	I	V	1	0.1	Avemectin B1	65195-55-3	2.5E+01	n	3.3E+02	n				8.0E+00	n	1.4E+01	n					
					Bazophenone	86-50-0	1.9E+02	c	2.5E+03	c	1.0E+01	n	4.4E+01	c	5.6E+01	c			1.7E-02	c				
					Bazocarbonamide	103-33-3	5.6E+00	c*	2.0E+02	c	9.1E-02	c	4.0E-01	c	1.2E-01	c			9.3E-04	c				
					Barium	123-77-3	8.0E+03	c*	4.0E+04	n	7.3E-03	n	3.1E-02	c			2.0E+04	n	6.8E-00	c	8.2E+01			
					Benfuralin	1861-40-1	1.5E+04	n	3.9E+02	n	5.8E+03	n				2.8E+01	n	9.4E-01	n					
					Benzomyl	17804-35-2	3.2E+03	n	4.1E+04	n						9.7E+02	n	8.5E-01	n					
					Bensulfuron-methyl	83055-99-6	1.3E+04	n	1.6E+05	n						3.9E+03	n	1.0E+00	n	1.2E-01				
					Bentazon	25057-89-0	1.9E+03	n	2.5E+04	n						5.7E+02	n							
4.0E-03	P	1.0E-01	I	V	1	0.1	Benzaldehyde	100-52-7	1.7E+02	c*	8.2E+02	c				1.9E+01	c	4.1E-03	c	2.3E-04	c*	2.6E-03		
5.5E-02	I	7.8E-06	I	4.0E-03	I	V	1	0.1	Benzene	71-43-2	1.2E+00	c	5.1E+00	c*	3.6E-01	c*	1.6E+00	c*	4.6E-01	c*	5.0E+00			
1.0E-01	X	3.0E-04	X	1	0.1	Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	5.4E+00	c*	2.3E+01	c*						7.8E-01	c*						
					Benzothiobiol	108-98-5	7																	

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice); c = cancer; n = noncancer; * = where n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide)																										
Toxicity and Chemical-specific Information									Contaminant				Screening Levels						SSLs							
SFO (mg/kg-day) ¹	k _e	IUR y/(ug/m ³) ⁻¹	k _e	RfC _x	k _v	o	muta-	GIAB	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater r (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)							
6.2E-02 7.9E-03	I I	3.7E-05 1.1E-06	C I	2.0E-02 2.0E-02 1.4E-03	I	V V 1	V	I	##### ##### ##### ##### #####	Bromodichloromethane	75-27-4	2.9E-01 1.9E+01	c c*	1.3E+00 8.6E+01	c c	7.6E-02 2.6E+00	c c	3.3E-01 1.1E+01 3.3E+00	c c	1.3E-01 8.0E+01(F)	8.0E+01(F)	3.6E-05 8.7E-04 1.9E-03	c c n	2.2E-02 2.1E-02		
1.0E-01 1.0E-01 3.4E+00 3.0E-05	O O C	1.5E-02 1.5E-02 3.0E-05 I	O O C I	2.0E-02 2.0E-03 3.0E-02	I	V V V V	V V 1	V V 1	##### ##### ##### #####	Bromoform	75-25-2	5.3E+00	c	2.2E+01	c	1.1E+00	c	3.3E+00	c	8.0E+01(F)	8.0E+01(F)	3.6E-05 8.7E-04 1.9E-03	c c n	2.1E-02 2.1E-02		
		5.0E-03	H	V	1	#####			74-83-9	Bromomethane																
1.0E-01 1.0E-01 3.4E+00 3.0E-05	O O C	1.5E-02 1.5E-02 3.0E-05 I	O O C I	2.0E-01 2.0E-03 3.0E-02	I	A V V	V V V	V V 1	#####	Bromophos	2104-96-3	3.9E+02	n	5.8E+03 ns	n	3.5E+01	n	2.1E+02	n			1.5E-01 6.4E-02 5.2E-04	n n c			
		1.0E-01	I	V	1	#####			71-36-3	Bromopropane, 1-	106-94-5	2.2E+02	n	9.4E+02	n	1.0E+02	n	4.4E+02	n							
		2.0E+00 5.0E-02	P I	3.0E+01 P V	V	V 1	1	1	#####	Bromoxynil	1689-84-5	6.7E+00	c	3.2E+01	c	4.9E-02	c*	4.1E-01	c							
2.0E-04 3.6E-03	C P	5.7E-08 3.0E-01	C	1	0.1	0.1		1	#####	Bromoxynil Octanoate	1689-99-2	5.8E-02	c*	2.6E-01	c	9.4E-02	c*	1.8E-02	c			2.1E-03 9.9E-06	c			
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butadiene, 1,3-	106-59-0	1.9E+03	s	2.5E+04	n	4.5E+02	n									
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butanoic acid, 4-(2,4-dichlorophenoxy)-	94-82-6															
		1.0E-01	I	V	1	#####			78-92-2	Butanol, N-	71-36-3	7.8E+03	ns	1.2E+05 nm	s nm			2.0E+03	n			4.1E-01	n			
		2.0E+00 5.0E-02	P I	3.0E+01 P V	V	V 1	1	1	#####	Butyl alcohol, sec-	2008-41-5	1.3E+05	s	1.5E+06	s	3.1E+04	n	1.3E+05	n	2.4E+04	n	5.0E+00 4.5E-01	n n			
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butylate	25013-16-5	2.7E+03	c	1.1E+04	c	4.9E+01	c	2.2E+02	c			2.9E-01 1.0E-01	c c			
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butylated hydroxyanisole	128-37-0	1.5E+02	c	6.4E+02	c					3.2E+00	n					
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butylated hydroxytoluene	104-51-8	3.9E+03	ns	5.8E+04	n											
		1.0E-01 2.0E+00 5.0E-02	I P V	1	0.1	0.1		1	#####	Butylbenzene, n-																
		1.0E-01	X	V	1	#####			135-98-8	Butylbenzene, sec-		7.8E+03	ns	1.2E+05 nm	s nm			2.0E+03	n			5.9E+00	n			
		1.0E-01 2.0E+00 5.0E-02	I A V	1	0.1	0.1		1	#####	Butylbenzene, tert-	98-06-6	1.8E+03	ns	1.2E+05	s			6.9E+02	n			1.6E+00 1.1E-01	n n			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Cacodylic Acid	75-60-5	1.3E+03	s	1.6E+04	n											
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Cadmium (Diet)	7440-43-9	7.1E+01	n	9.8E+02	n											
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Cadmium (Water)	7440-43-9															
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Caprolactam	105-60-2	3.1E+04	n	4.0E+05	nm	1.6E-03	c**	6.8E-03	c**	9.2E+00	n	5.0E+00 2.5E+00	n n	3.8E-01		
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Captanol	12425-06-1	3.6E+00	c*	1.5E+01	c	6.5E-02	c	2.9E-01	c	4.0E-01	*c	7.1E-04 2.2E-02	c c*			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbazyl	133-06-2	2.4E+02	c*	1.0E+03	c	4.3E+00	c	1.9E+01	c	3.1E+01	c	1.7E-00	n			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbofuran	1563-66-2	3.2E+02	c	4.1E+03	n	7.3E+02	n	3.1E+03	n	9.4E+01	n	4.0E+01	3.7E-02	1.6E-02		
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbon Disulfide	175-15-0	7.7E+02	ns	3.5E+03	n	8.3E+02	n	2.0E+00	c	4.6E-01	c	2.4E-01 1.8E-04	n c	1.9E-03		
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbon Tetrachloride	56-23-5	5.6E-01	c	2.9E+00	n	4.7E-01	c	2.0E+00	c	5.0E+00						
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbonyl Sulfide	463-58-1	6.7E+01	c	2.8E+02	n	1.0E+02	n	4.4E+02	n	2.1E+02	n					
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carbosulfan	55285-14-8	6.3E+02	s	8.2E+03	n											
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Carboxin	5234-68-4	6.3E+03	s	8.2E+04	n											
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Ceric oxide	1308-38-3	1.3E+06	nm	5.4E+06	nm	9.4E-01	n	3.9E+00	n			4.0E-01	n			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloral Hydrate	302-17-0	7.8E+03	n	1.2E+05	nm			2.0E+03	n			4.0E-01 7.0E-02	n n			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloramben	133-90-4	9.5E+02	c	1.2E+04	n			2.9E+02	n							
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloranil	118-75-2	1.3E+00	c	5.7E+00	c											
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloranilane	12789-03-6	1.7E+00	c	7.7E+00	c*	2.8E-02	c*	1.2E-01	c	2.0E-02	c*	2.0E+00	c	2.7E-03 1.2E-04	c c	2.7E-01
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloranone (Kepone)	143-50-0	5.4E-02	c	2.3E-01	c	6.1E-04	c	2.7E-03	c	3.5E-03	c					
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chlordecone	470-90-6	4.4E+01	n	5.7E+02	n			1.1E+01	n							
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chlorfenvinphos	470-90-6	4.4E+01	n	5.7E+02	n			1.1E+01	n							
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chlorimuron, Ethyl-	9098-32-4	5.7E+03	s	7.4E+04	n			1.8E+03	n							
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chlorine Dioxide	1782-50-5	1.8E-01	n	7.8E-01	n	1.5E-01	n	6.4E-01	n	3.0E-01	n					
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chlorite (Sodium Salt)	10049-04-4	2.3E+03	s	3.4E+04	n	2.1E-01	n	8.8E-01	n	4.2E-01	n					
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloro-1,1-difluoroethane, 1-	75-68-3	5.4E+04	ns	2.3E+05	s	5.2E+04	n	2.2E+05	n	1.0E+05	n			5.2E+01	n	
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloro-1,3-butadiene, 2-	126-99-8	1.0E-02	c	4.4E-02	c	9.4E-03	c	4.1E-02	c	1.9E-02	c	9.8E-06 1.5E-04	c c			
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05	0.001	1	0.1	Chloro-2-methylaniline HCl, 4-	3165-93-3	1.2E+00	c	5.0E+00	c					4.0E-04	c*					
		1.8E-03 1.8E-03	I I	1.0E-03 1.0E-04	A	0.025 0.05																				

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Toxicity and Chemical-specific Information										Contaminant			Screening Levels															
SFO (mg/kg-day) ⁻¹	k _e	IUR (ug/m ³) ⁻¹	k _e	RfD _o (mg/kg-day) ⁻¹	k _e	RfC _o (mg/m ³) ⁻¹	k _e	muta- gen	GIAB S	ABS	C _{sat} (mg/kg)	Analyte	CAS No. 160615-83-1	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater (ug/m ³) key	MCL (ug/L)	Risk-based SSL (mg/kg) 4.0E+07 n	MCL-based SSL (mg/kg)							
5.0E-01	C	8.4E-02	S	3.0E-03	I	1.0E-04	I	M	0.025		0.013	Chromium(III), Insoluble Salts		1.2E+05	n	1.8E+06	c	1.2E-05	c	1.5E-04	2.2E+04	1.0E+02	6.7E-04	c	1.8E+05			
						1.3E-02	I		0.013		0.1	Chromium(VI)	18540-29-9	3.0E-01	c	6.3E+00	n											
												Chromium, Total	7440-47-3															
												Clofentezine	74115-24-5															
9.0E-03	P	3.0E-04	P	6.0E-06	P	1	V	M	1			Cobalt	7440-48-4	8.2E+02	n	1.1E+04	n	3.1E-04	c*	1.4E-03	c*	6.0E+00	n	1.0E+02	1.4E+01	n	2.7E+01	
6.2E-04	I						H					Coke Oven Emissions	8007-45-2	2.3E+01	n	3.5E+02	n	1.6E-03	c	2.0E-02	c							
												Copper	7440-50-8	3.1E+03	n	4.7E+04	n											
5.0E-02	I	6.0E-01	C	1	0.1							Cresol, m-	108-39-4	3.2E+03	n	4.1E+04	n	6.3E+02	n	2.6E+03	n	9.3E+02	n	7.4E-01	n			
5.0E-02	I	6.0E-01	C	1	0.1							Cresol, o-	95-48-7	3.2E+03	n	4.1E+04	n	6.3E+02	n	2.6E+03	n	9.3E+02	n	7.5E-01	n			
1.0E-01	A	6.0E-01	C	1	0.1							Cresol, p-	106-44-5	6.3E+03	n	8.2E+04	n	6.3E+02	n	2.6E+03	n	1.9E+03	n	1.5E+00	n			
1.0E-01	A	6.0E-01	C	1	0.1							Crotonaldehyde, trans-	123-73-9	5.9-50-7	n	6.3E+03	n	8.2E+04	n							1.7E+00	n	
1.9E+00	H					V	V		1			Cumene	98-82-8	1.9E+03	ns	9.9E+03	ns	4.2E+02	n	1.8E+03	n	4.5E+02	n	1.0E+02	1.4E-01	n		
2.2E-01	C	6.3E-05	C	1								Cupferron	135-20-6	2.5E+00	c	1.0E+01	c	4.5E-02	c	1.9E-01	c	3.5E-01	c	6.1E-04	c			
8.4E-01	H					H			1			Cyanazine	21725-46-2	6.5E-01	c	2.7E+00	n								4.1E-05	c		
												Cyanides																
												-Calcium Cyanide	592-01-8	7.8E+01	n	1.2E+03	n								n			
												Copper Cyanide	544-92-3	3.9E+02	n	5.8E+03	n								1.0E+02	n		
												-Cyanide (CN-)	57-12-5	2.3E+01	n	1.5E+02	n	8.3E-01	n	3.5E+00	n	1.5E+00	n	2.0E+02	1.5E-02	n	2.0E+00	
												-Cyanogen	460-19-5	7.8E+01	n	1.2E+03	n								n			
												-Cyanogen Broxide	506-68-3	7.0E+03	n	1.1E+05	n								n			
												Cyanogen Chloride	506-77-4	3.9E+03	n	5.8E+04	n								n			
												-Hydrogen Cyanide	74-90-8	2.3E+01	n	1.5E+02	n	8.3E-01	n	3.5E+00	n	1.5E+00	n	1.5E-02	n			
												-Potassium Cyanide	151-50-8	1.6E+02	n	2.3E+03	n								n			
												-Potassium Silver Cyanide	506-61-6	3.9E+02	n	5.8E+03	n								n			
												Silver Cyanide	506-64-9	7.8E+03	n	1.2E+05	n								n			
												Sodium Cyanide	143-33-9	7.8E+01	n	1.2E+03	n								2.0E+02	1.3E+01	n	
												Thiocyanates	E1790664	1.6E+01	n	2.3E+02	n								n			
												-Thiocyanic Acid	463-56-9	1.6E+01	n	2.3E+02	n								n			
												-Zinc Cyanide	557-21-1	3.9E+03	n	5.8E+04	n								n			
2.0E-02	X											Cyclohexane	110-82-7	6.5E+03	ns	2.7E+04	n	6.3E+03	n	2.6E+04	n	1.3E+04	n	2.8E+00	1.3E+01	n	1.6E-02	
												Cyclohexane, 1,2,3,4,5,pentabromo-6-chloro-	87-84-3	2.7E+01	c*	1.1E+02	c								n			
												Cyclohexane	108-94-1	2.8E+04	ns	1.3E+05	s	7.3E+02	n	3.1E+03	n	1.4E+03	n		3.4E-01	n		
												Cyclohexene	110-83-8	3.1E+02	ns	3.1E+03	n	1.0E+03	n	4.4E+03	n	7.0E+01	n	4.6E-02	n			
												Cyclohexylamine	108-91-8	1.6E+04	n	2.3E+05	n								1.0E+00	n		
												Cyfluthrin	68359-37-5	1.6E+03	n	2.1E+04	n								3.1E+01	n		
												Cyhalothrin	68085-85-8	6.3E+01	n	8.2E+02	n								1.4E+01	n		
												Cyromazine	66215-27-8	3.2E+04	n	4.1E+05	n								2.5E+00	n		
2.4E-01	I	6.9E-05	C	3.0E-04	X	V	V		1		0.1	DDD, p,p'-DDD	72-54-8	1.9E+00	c*	9.6E+00	c*	4.1E-02	c	1.8E-01	c	3.2E-02	c**	7.5E-03	c**			
3.4E-01	I	9.7E-05	C	3.0E-04	X	V	V		1		0.1	DDE, p,p'	72-55-9	2.0E+00	c*	9.3E+00	c*	2.9E-02	c	1.3E-01	c	4.6E-02	c	1.1E-02	c			
3.4E-01	I	9.7E-05	I	5.0E-04	I	V	V		1		0.1	DDT	50-29-3	1.9E+00	c*	8.5E+00	c*	2.9E-02	c	1.3E-01	c	2.3E-01	c	7.7E-02	c*			
				3.0E-02	I	V	V		1			Dalapon	75-99-0	1.9E+03	n	2.5E+04	n							1.2E-01	n	4.1E-02	n	
1.8E-02	C	5.1E-06	C	1.5E-01	I	V	V		1		0.1	Daminozoide	1596-84-5	3.0E+01	c	1.3E+02	c	5.5E-01	c	2.4E+00	c	4.3E+00	c	9.5E-04	c			
7.0E-04	I			7.0E-03	I	V	V		1		0.1	Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	4.4E+02	c	3.3E+03	c*	4.4E+02	c	1.2E+01	c*	1.1E+02	c*	6.2E+01	c*			
				4.0E-05	I	V	V		1		0.1	Demeton	8065-48-3	2.5E+00	n	3.3E+01	n								n			
1.2E-03	I			6.0E-02	I	V	V		1		0.1	Di(2-ethylhexyl)adipate	103-23-1	4.5E+02	c*	1.9E+03	c								4.0E+02	4.7E+00	c	2.9E+01
6.1E-02	H			7.0E-04	A	V	V		1		0.1	Di(2-ethylhexyl)adipate	2303-16-4	8.9E+00	c	3.8E+01	c								6.5E-02	n		
				7.0E-04	A	V	V		1		0.1	Dibenzo thiophene	132-65-0	7.8E+02	n	1.2E+04	n								1.2E+00	n		
8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1		Dibromo-3-chloropropane, 1,2-	96-12-6	5.3E-03	c	6.4E-02	c	1.7E-04	c	2.0E-03	c	3.3E-04	c	2.0E-01	1.4E-07	c	8.6E-05	
				4.0E-04	X	V	V		1			Dibromobenzene, 1,3-	108-36-1	3.1E+01	n	4.7E+02	n								5.1E-03	n		
												Dibromobenzene, 1,4-	106-37-6	7.8E+02	n	1.2E+04	n								1.2E-01	n		
8.4E-02	I			1.0E-02	I	V	V		1		0.1	Dibromochloromethane	124-48-1	8.3E+00	c	3.9E+01	c								8.0E+01(F)	2.3E-04	c	2.1E-02
2.0E+00	I	6.0E-04	I	9.0E-03	I	V	V		1		0.1	Dibromoethane, 1,2-	106-93-4	3.6E-02	c	1.6E-01	c	4.7E-03	c	2.0E-02	c	7.5E-03	c	5.0E-02	2.1E-06	c	1.4E-05	
												Dibromomethane (Methylene Bromide)	74-95-3	2.4E+01	n	9.9E+01	n</											

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Toxicity and Chemical-specific Information										Contaminant					Screening Levels																		
SFO (mg/kg-day) ⁻¹	k _e	IUR (ug/m ³) ⁻¹	k _e	RfD _y (mg/kg-day) ⁻¹	k _e	RfC _y (mg/m ³) ⁻¹	k _e	o	v	gen	GIAB S	ABS 0.1	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater r (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)										
1.6E+01	I	4.6E-03	I	3.0E-05	O	3.0E-04	X	V	1	1	1	0.1	#####	Dicrotophos	141-66-2	1.9E+00	n	2.5E+01	n	6.0E-01	n	1.4E-04	n										
		5.0E-05	I	8.0E-02	P	3.0E-04	X	V	1	1	1	0.1	#####	Dicyclopentadiene	77-73-6	1.3E+00	n	5.4E+00	n	6.3E-01	n	2.2E-03	n										
													#####	Dieldrin	60-57-1	3.4E-02	c*	1.4E-01	c	2.7E-03	c	7.1E-05	c										
													#####	Diesel Engine Exhaust	E17136615			9.4E-03	c	4.1E-02	c												
													#####	Diethanolamine	111-42-2	1.3E+02	n	1.6E+03	n	8.8E-01	n	4.0E+01	n										
													#####	Diethylene Glycol Monobutyl Ether	111-34-5	1.9E+03	n	2.4E+04	n	1.0E-01	n	4.4E-01	n										
													#####	Diethylene Glycol Monoethyl Ether	111-90-0	3.8E+03	n	4.8E+04	n	1.3E-01	n	1.2E+03	n										
													#####	Diethylformamide	617-84-5	7.6E+01	n	1.2E+03	n	2.0E+01	n	4.1E-03	n										
3.5E+02	C	1.0E-01	C	6.0E-02	P	3.0E-04	P	V	1	1	1	0.1	#####	Diethylstibestrol	66-53-1	1.6E-03	c	6.6E-03	c	2.8E-05	c	5.1E-05	c										
													8.3E-02	O	43222-48-6	5.2E+03	n	6.8E+04	n	1.7E+03	n	2.6E+02	n										
													2.0E-02	I	85367-38-5	1.3E+03	n	1.6E+04	n	2.9E+02	n	3.3E-01	n										
													4.0E+01	I	V	1	#####	Difluoroethane, 1,1-	75-37-5	4.8E+04	ns	2.0E+05	s	4.2E+04	n	1.8E+05	n	8.3E+04	n				
													3.0E+01	X	V	1	#####	Difluoropropane, 2,2-	420-45-1	2.4E+04	ns	1.0E+05	s	3.1E+04	n	1.3E+05	n	6.3E+04	n				
													7.0E-01	C	V	1	#####	Dihydroasrole	94-58-6	9.9E+00	c	4.5E+01	c	2.2E-01	c	9.4E-01	c	3.0E-01	c				
													2.2E-02	P	V	1	#####	Disopropyl Ether	108-20-3	2.2E+03	n	9.4E+03	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n				
													8.0E-02	I	V	1	#####	Disopropyl Methylphosphonate	1445-75-6	6.3E+03	n	9.3E+04	ns					4.5E-01	n				
4.4E-02	C	1.3E-05	C	6.0E-02	P	3.0E-04	V	V	1	1	1	0.1	#####	Dimethipin	55290-64-7	1.4E+03	n	1.8E+04	n	4.4E+02	n	9.6E-02	n										
													2.2E-03	O	60-51-5	1.4E+02	n	1.8E+03	n	4.4E+01	n	9.9E-03	n										
													1.6E+00	P	6.0E-02	P	1	#####	Dimethoxybenzidine, 3,3'-	119-90-4	3.4E-01	c	1.4E+00	c	4.7E-02	c	5.8E-05	c					
													1.7E-03	P	6.0E-02	P	1	#####	Dimethyl methylphosphonate	756-79-6	3.2E+02	c*	1.4E+03	c*	4.6E+01	c*	9.6E-03	c*					
													4.6E+00	C	1.3E-03	C	1	#####	Dimethylamino azobenzene [p-]	60-11-7	1.2E-01	c	5.0E-01	c	2.2E-03	c	2.1E-05	c					
													5.8E-01	H	V	1	#####	Dimethylaniline HCl, 2,4-	21436-96-4	9.4E-01	c	4.0E+00	c	1.3E-01	c	1.2E-04	c						
													2.0E-01	P	2.0E-03	X	1	#####	Dimethylaniline, 2,4-	95-68-1	2.7E+00	c	1.1E+01	c	3.7E-01	c	2.1E-04	c					
													2.7E-02	P	2.0E-03	I	V	1	#####	Dimethylaniline, N,N'	121-69-7	2.6E+01	c	1.2E+02	c	2.5E+00	c*	9.0E-04	c*				
1.1E+01	P												1.0E-01	P	3.0E-02	I	V	1	#####	Dimethylbenzidine, 3,3'	119-93-7	4.9E-02	c	2.1E-01	c	6.5E-03	c	4.3E-05	c				
													1.0E-04	X	2.0E-06	X	V	1	#####	Dimethylformamide	68-12-2	2.6E+03	n	1.5E+04	n	3.1E+02	n	1.2E-02	n				
													1.0E-04	O	2.0E-06	X	V	1	#####	Dimethylhydrazine, 1,1-	57-14-7	5.7E-02	n	2.4E-01	n	8.8E-03	n	4.2E-03	n				
													5.5E+02	C	1.6E-01	C	V	1	#####	Dimethylhydrazine, 1,2-	540-73-0	8.0E-04	c	4.1E-03	c	1.8E-05	c	7.8E-05	c				
													2.0E-02	I	V	1	#####	Dimethylphenol, 2,4-	105-67-9	1.3E+03	n	1.6E+04	n	3.6E+02	n	4.2E-01	n						
													6.0E-04	I	V	1	#####	Dimethylphenol, 2,6-	576-26-1	3.8E+01	n	4.9E+02	n	1.1E+01	n	1.3E-02	n						
													1.0E-03	I	V	1	#####	Dimethylphenol, 3,4-	95-65-8	6.3E+01	n	8.2E+02	n	1.8E+01	n	2.1E-02	n						
													8.0E-03	X	P	V	1	#####	Dimethylvinylchloride	513-37-1	1.1E+00	c	4.8E+00	c	2.2E-01	c	3.3E-01	c					
6.8E-01	I												1.0E-03	P	8.0E-05	X	V	1	#####	Dinitro-o-cresol, 4,6-	534-52-1	5.1E+00	n	6.6E+01	n	1.5E+00	n	2.6E-03	n				
													2.0E-03	I	V	1	#####	Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5	1.3E+02	n	1.6E+03	n	2.3E+01	n	7.7E-01	n						
													1.0E-04	P	6.0E-04	X	V	1	#####	Dinitrobenzene, 1,2-	528-29-0	6.3E+00	n	8.2E+01	n	1.9E+00	n	1.8E-03	n				
													1.0E-04	I	V	1	#####	Dinitrobenzene, 1,3-	99-65-0	6.3E+00	n	8.2E+01	n	2.0E+00	n	1.8E-03	n						
													1.0E-04	P	V	1	#####	Dinitrobenzene, 1,4-	100-25-4	6.3E+00	n	8.2E+01	n	2.0E+00	n	1.8E-03	n						
													2.0E-03	I	V	1	#####	Dinitrophenol, 2,4-	51-28-5	1.3E+02	n	1.6E+03	n	3.9E+01	n	4.4E-02	n						
													2.0E-03	I	V	1	#####	Dinitrotoluene Mixture, 2,4/2,6-	E1615210	8.0E-01	c	3.4E+00	c	1.1E-01	c	1.5E-04	c						
													121-14-2	P	7.0E-02	I	V	1	#####	Dinitrotoluene, 2,4-	606-20-2	1.7E+00	c*	7.4E+00	c	3.2E-02	c	1.4E-01	c				
4.5E-01	C	8.9E-05	C	2.0E-03	I	1	0.102	1	0.03				1.5E+00	P	3.0E-04	X	V	1	#####	Dinitrotoluene, 2,6-	35572-78-2	3.6E-01	c	1.5E+00	c	4.9E-02	c	6.7E-05	c				
													2.0E-03	S	1	0.009	1	0.006	1	#####	Dinitrotoluene, 2-Amino-4,6-	505-29-3	1.5E+02	c*	2.3E+03	n	3.9E+01	n	3.0E-02	n			
													2.0E-03	S	1	0.009	1	0.009	1	#####	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	1.5E+02	n	2.3E+03	n	3.9E+01	n	3.0E-02	n			
													2.0E-03	X	1	0.04	1	0.01	1	#####	Dinitrotoluene, Technical grade	25321-14-6	1.2E+00	c*	5.1E+00	c	1.0E-01	c	1.4E-04	c			
													1.0E-03	I	1	0.01	1	0.01	1	#####	Dinoseb	88-85-7	6.3E+01	n	8.2E+02	n	1.5E+01	n	1.3E-01	n			
													1.0E-01	I	5.0E-06	I	3.0E-02	I	1	#####	Dioxane, 1,4-Dioxins	123-91-1	5.3E+00	c	2.4E+01	c	5.6E-01	c*	2.5E+00	c*			
													6.2E+03	I	1.3E+00	I		1	0.03	1	#####	-Hexachlorobenzo-p-dioxin, Mixture		1.0E-04	c	4.7E-04	c	2.2E-06	c	9.5E-05	c		
													1.3E+05	C	3.8E+01	C	7.0E-10	I	4.0E-08	C	V	1	#####	-TCDD, 2,3,7,8-	1746-01-6	957-51-7	4.8E-06	c*	2.5E-05	c	7.4E-08	c	3.2E-07
7.1E+00	C	1.4E-01	C	7.0E-10	I	4.0E-08	C	V	1	1	1	0.1</td																					

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Contaminant															Screening Levels									SSLs		
SFO (mg/kg-day) ⁻¹	k _e	IUR	k _e	RF _d	k _e	RfC _c	k _v	k _e / muta-	GIA/B	C _{sat}	Contaminant	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater r (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)					
1.1E-02	C	2.5E-06	C	1.0E-01	I	1.0E+00	I	V	I	0.1	#####[REDACTED]	Ethyl-p-nitrophenyl Phosphonate	2104-64-5	n	8.2E+00	n	1.8E+03	c	4.9E+00	c	1.5E+00	7.0E+02	2.8E-03	n		
				1.0E-05	I				1	0.1	#####[REDACTED]	Ethylbenzene	100-41-4	c	2.5E+01	n	2.2E+03	c	5.9E+02	n	1.7E-03	c	7.8E-01			
				7.0E-02	P		V		1	0.1	#####[REDACTED]	Ethylene Cyanhydrin	109-78-4	c	4.4E+03	n	5.7E+04	c	1.4E+03	n	2.8E-01	n				
				9.0E-02	P		V		1	0.1	#####[REDACTED]	Ethylene Diamine	107-15-3	n	1.1E+05	nm			1.8E+03	n			4.1E-01	n		
				2.0E+00	I	4.0E-01	C		1	0.1	#####[REDACTED]	Ethylene Glycol	107-21-1	c	1.3E+05	nm	4.2E+02	n	1.8E+03	n	4.0E+04	n	8.1E+00	n		
				1.0E-01	I	1.6E+00	I		1	0.1	#####[REDACTED]	Ethylene Glycol Monobutyl Ether	111-76-2	c	6.3E+03	n	8.2E+04	n	1.7E+03	n	2.0E+03	n	4.1E-01			
3.1E-01	C	3.0E-03	I			3.0E-02	C	V	M	1	#####[REDACTED]	Ethylene Oxide	75-21-8	c	2.0E-03	c	2.5E-02	c	3.4E-04	c	4.1E-03	c	6.7E-04	c		
4.5E-02	C	1.3E-05	C	8.0E-05	I				1	0.1	#####[REDACTED]	Ethylene Thiourea	96-45-7	c	5.1E+00	n	5.1E+01	c	2.2E+01	c	9.4E-01	c	1.6E+00	n		
6.5E+01	C	1.9E-02	C				V		1	0.1	#####[REDACTED]	Ethylenimine	151-56-4	c	2.7E-03	c	1.2E-02	c	1.5E-04	c	6.5E-04	c	2.4E-04	c		
				3.0E+00	I				1	0.1	#####[REDACTED]	Ethylphthalyl Ethyl Glycolate	84-72-0	c	1.9E+05	nm	2.5E+06	nm			5.8E+04	n	1.3E+02	n		
				2.5E-04	I				1	0.1	#####[REDACTED]	Fenamiphos	22224-92-6	c	1.6E+01	n	2.1E+02	n			4.4E+00	n	4.3E-03	n		
				2.5E-02	I				1	0.1	#####[REDACTED]	Fenpropidrin	39515-41-8	c	1.6E+03	n	2.1E+04	n			6.4E+01	n	2.9E+00	n		
				2.5E-02	I				1	0.1	#####[REDACTED]	Fenvalerate	51630-58-1	c	1.6E+03	n	2.1E+04	n			5.0E+02	n				
				1.3E-02	I				1	0.1	#####[REDACTED]	Fluometuron	2164-17-2	c	8.2E+02	n	1.1E+04	n			2.4E+02	n	1.9E-01	n		
				4.0E-02	C	1.3E-02	C		1	0.1	#####[REDACTED]	Fluoride	16984-48-8	c	3.1E+03	c	4.7E+04	n	1.4E+01	n	5.7E+01	n	8.0E+02	n		
				6.0E-02	I	1.3E-02	C		1	0.1	#####[REDACTED]	Fluorine (Soluble Fluoride)	7782-41-4	c	4.7E+03	n	7.0E+04	n	1.4E+01	n	5.7E+01	n	4.0E+03	n		
				8.0E-02	I				1	0.1	#####[REDACTED]	Flurdone	59756-60-4	c	5.1E+03	n	6.6E+04	nm			1.4E+03	n	1.6E-02	n		
				4.0E-02	O				1	0.1	#####[REDACTED]	Fluprimidol	56425-91-3	c	2.5E+03	n	3.3E+04	nm			6.9E+02	n	3.1E+00	n		
				2.0E-03	O				1	0.1	#####[REDACTED]	Flusilazole	85509-19-9	c	1.3E+02	n	1.6E+03	n			3.1E+01	n	5.1E+00	n		
				5.0E-01	O				1	0.1	#####[REDACTED]	Flutolanil	66332-96-5	c	3.2E+04	n	4.1E+05	nm			7.9E+03	n	4.2E+01	n		
				1.0E-02	I				1	0.1	#####[REDACTED]	Fluvalinate	69409-94-5	c	6.3E+02	n	8.2E+03	n			2.0E+02	n	2.9E+02	n		
				9.0E-02	O				1	0.1	#####[REDACTED]	Folpet	133-07-3	c	5.7E+03	c	7.4E+04	n			1.6E+03	n	3.9E-01	n		
				2.5E-03	O				1	0.1	#####[REDACTED]	Fomesafen	72178-02-0	c	1.6E+02	n	2.1E+03	n			4.8E+01	n	1.6E-01	n		
				2.0E-03	I				1	0.1	#####[REDACTED]	Fonofos	944-22-9	c	1.3E+02	c	1.6E+03	n			2.4E+01	n	4.7E-02	n		
1.3E-05	I			2.0E-01	I	9.8E-03	A	V	1	0.1	#####[REDACTED]	Formaldehyde	50-00-0	c	1.7E+01	c	7.3E+01	c	2.2E-01	c	9.4E-01	c	4.3E-01	c*		
9.0E-01	P	3.0E-04	X	2.5E+00	V				1	0.1	#####[REDACTED]	Formic Acid	64-18-6	c	2.9E+01	n	3.2E+02	n	3.1E-01	n	1.3E+00	n	1.3E-04	n		
				9.0E-01	O				1	0.1	#####[REDACTED]	Fosetyl-AL	39148-24-8	c	1.6E+05	nm	2.1E+06	nm			5.0E+04	n	6.6E+02	n		
				1.0E-03	X		V		1	0.03	#####[REDACTED]	Furans	132-64-9	n	7.3E+01	n	1.0E+03	n			7.9E+00	n	1.5E-01	n		
				1.0E-03	I		V		1	0.03	#####[REDACTED]	-Dibenzofuran	110-00-9	n	7.3E+01	n	1.0E+03	n			7.3E-03	n				
				9.0E-01	I	2.0E+00	I	V	1	0.03	#####[REDACTED]	-Tetrahydrofuran	109-99-9	c	1.8E+04	c	9.4E+04	n	2.1E+03	n	8.8E+03	n	3.4E+03	n		
3.8E+00	H			3.0E-03	I	5.0E-02	H	V	1	0.1	#####[REDACTED]	Furazolidone	67-45-8	c	1.4E+01	c	6.0E-01	c			2.0E-02	c	3.9E-05	c		
											#####[REDACTED]	Furfural	98-01-1	c	2.1E+02	c	2.6E+03	n	5.2E+01	n	2.2E+02	n	3.8E+01	n		
1.5E+00	C	4.3E-04	C								#####[REDACTED]	Furium	531-82-8	c	3.6E-01	c	1.5E+00	c	6.5E-03	c	2.9E-02	c	5.1E-02	c		
3.0E-02	I	8.6E-06	C	6.0E-03	O						#####[REDACTED]	Furmecyclo	60568-05-0	c	1.8E+01	c	7.7E+01	c	3.3E-01	c	1.4E+00	c	1.2E-03	c		
											#####[REDACTED]	Glufosinate, Ammonium	77182-82-2	c	3.8E+02	c	9.4E+03	n			1.2E+02	n	2.6E-02	n		
											#####[REDACTED]	Glutaraldehyde	111-30-8	c	6.0E+03	c	7.0E+04	n	8.3E-02	n	3.5E-01	n	2.0E+03	n		
											#####[REDACTED]	Glycidyl Glycophos	765-34-4	c	2.3E+01	c	2.1E+02	n	1.0E+00	n	4.4E+00	n	3.3E-04	n		
											#####[REDACTED]	Glyphosate	1071-83-6	c	8.2E+04	n					2.0E+03	n	8.8E+00	3.1E+00		
											#####[REDACTED]	Guanidine	113-00-8	c	7.8E+02	c	1.2E+04	n			2.0E+02	n	4.5E-02	n		
											#####[REDACTED]	Guanidine Chloride	50-01-1	c	1.3E+01	c	1.6E+04	n			4.0E+02	n				
											#####[REDACTED]	Guanidine Nitrate	506-93-4	c	1.9E+03	c	2.5E+04	n			6.0E+02	n	1.5E-01	n		
											#####[REDACTED]	Haloxypot, Methyl	69806-40-2	c	3.2E+00	c	4.1E+01	n	7.0E+02	c	7.6E-01	c	8.4E-03	n		
4.5E+00	I	1.3E-03	I	5.0E-04	V				1	1.01	#####[REDACTED]	Heptachlor	76-44-8	c	1.3E-01	c	6.3E-01	c	2.2E-03	c	9.4E-03	c	4.0E-01	c		
9.1E+00	I	2.6E-03	I	1.3E-05	V				1	1.01	#####[REDACTED]	Heptachlor Epoxide	1024-57-3	c	2.0E-02	c	3.9E-02	c	1.4E-03	c	1.4E-03	c	2.8E-05	c*		
											#####[REDACTED]	Heptan-1-ene	111-71-7	c	2.4E+01	c	1.0E+02	c	3.1E+00	n	1.3E+01	n	6.3E+00	n		
											#####[REDACTED]	Heptane, N-	142-82-5	c	2.2E+01	c	9.2E+02	n	4.2E+02	n	1.8E+03	n	4.8E-02	n		
											#####[REDACTED]	Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2	c	1.3E+01	c	1.6E+02	n			4.0E+00	n				
											#####[REDACTED]	Hexachlorobenzene	118-74-1	c	2.1E-01	c	9.6E-01	c	6.1E-03	c	2.7E-02	c	9.8E-03	c		
											#####[REDACTED]	Hexachlorobutadiene	87-68-3	c	1.2E+00	c	5.3E+00	c	1.3E-01	c	5.6E-01	c	1.4E-01	c*		
6.3E+00	I	1.8E-03	I	8.0E-03	A				1	0.1	#####[REDACTED]	Hexachlorocyclohexane, Alpha-	319-84-6	c	8.6E-02	c	3.6E-01	c	1.6E-03	c	6.8E-03	c	7.2E-03	c		
1.8E+00	I	5.3E-04	I	1.8E-05	A				1	0.1	#####[REDACTED]	Hexachlorocyclohexane, Beta-	319-85-7	c	3.0E-01	c	1.3E+00	c	5.3E-03	c	2.3E-02	c	1.5E-04	c		
1.1E+00	C	3.1E-04	C	3.0E-04	I				1	0.04	#####[REDACTED]	Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	c	5.7E-01	c	2.5E+05	n	9.1E-03	c	4.0E-02	c	4.2E-02	c*		
1.8E+00	I	5.1E-04	I																							

Key: I = IRIS; P = PPTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice); c = cancer; n = noncancer; * = where n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; n' = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Cst (See User Guide)																						
Contaminant									Screening Levels													
SFO (mg/kg-day) ⁻¹	k _e	IUR _y (ug/m ³) ⁻¹	k _e RfD _y	k _e RfC _y	k _v eo	k _v muta- gen	GIAB S	ABS	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwate r (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)			
9.5E-04 I	3.0E-01 2.0E-01	I 2.0E+00	V C	1	1	0.1	*****			Isobutyl Alcohol	78-83-1 78-59-1	2.3E+04 5.7E+02	ns c*	3.5E+05 2.4E+03	s c*	5.9E+03 2.1E+03	n n	7.8E+01 8.8E+03	c*	1.2E+00 2.6E-02	n c*	
	1.5E-02 2.0E+00	I P	V 2.0E-01	P V	1	1	*****			Isopropaline	33820-53-0	1.2E+03 5.6E+03 6.3E+03	n n n	1.8E+04 2.4E+04 2.5E+04	n n n	4.0E+01 4.1E+02 2.0E+03	n		9.2E-01 8.4E-02 4.3E-01	n		
	1.0E-01 5.0E-02	I O		1	0.1	1	*****			Isopropyl Alcohol	1832-54-8	3.2E+03 1.8E+02	n nm	4.1E+04 3.4E+08	n nm	7.3E+02 3.1E+02	n n	6.3E+02 1.3E+03	n n	2.0E+00 4.6E+00	n	
	8.0E-03 2.0E-04	O X		A V	1	0.1				Isobutanol	82550-30-7	3.2E+03 5.1E+02	n n	1.8E+04 6.6E+03	nm n	1.3E+02 1.0E+02	n n	4.0E+00 4.0E+00		8.1E-04 n		
8.5E-03 C	1.2E-05 C				1		*****			Lactonitrile	77501-63-4	78-97-7	1.3E+01 n	1.6E+02 n	n							
	3.0E-01 2.0E-04	A X		V	1	0.1				Lead Compounds ~Lead Phosphate	78-77-0	8.2E+01 4.0E+02	c L	3.8E+02 2.7E+02	c c	1.0E+00 1.0E+01	c L	c c	9.1E+00 1.5E+01	c L	1.8E-03 1.4E+01	c c
8.5E-03 C	1.2E-05 C				1	0.1				~Lead acetate	301-04-2	6.4E+01 4.0E+02	c L	2.3E+01 1.5E-01	c L	1.0E+00 1.5E+01	c L	c c	9.2E+00 1.5E+01	c L	1.8E-03 2.0E-03	c c
8.5E-03 C	1.2E-05 C				1	0.1				~Lead and Compounds ~Lead subacetate	170-92-1 1335-32-6	6.4E+01 2.7E+02	c c	2.3E+01 1.0E+00	c c	1.0E+00 9.2E+00	c c	c c	1.5E+01 1.5E+01	c c	1.8E-01 1.4E+01	c c
	1.0E-07 5.0E-06	I P	V	V	1	0.1	*****			Tetraethyl Lead	78-00-2	7.8E-03 3.9E-01	n n	1.2E-01 5.8E+00	n n	1.3E-03 9.0E-02	n			4.7E-06 3.8E-05	n	
	7.7E-03 O				1	0.1	*****			Lewisite	541-25-3	4.9E+02 6.3E+03	n							1.1E-01 n		
	3.0E-03 5.0E-04	P I	V	V	1	0.1				Linuron	330-55-2	1.6E+02 3.2E+01	n n	2.3E+03 4.1E+02	n n	1.3E+02 7.5E+00	n			1.2E+01 2.0E-03	n	
	4.4E-03 1.0E-01	O I	7.0E-04 C	V	1	0.1				Lithium	7439-93-2	1.6E+02 1.3E+03	n n	2.3E+03 6.6E+03	n n	4.0E+01 3.9E+02	n			2.6E-02 1.0E-01	n	
	1.0E-03 2.0E-02	I I	V	V	1	0.1				MCPBA	94-74-6	3.2E+01 2.8E+02	n n	4.1E+02 3.6E+03	n n	7.5E+00 6.5E+01	n			4.7E-03 2.6E-02	n	
	1.0E-03 2.0E-02	I I	V	V	1	0.1				Malathion	121-75-5	1.3E+02 1.3E+03	n n	2.3E+03 6.6E+03	n n	1.6E+01 3.9E+02	n			4.7E-03 1.0E-01	n	
	1.0E-01 3.0E-02	I H	V	V	1	0.1				Maleic Anhydride	108-31-6	6.3E+03 8.0E+04	n							3.8E-01 7.6E-01	n	
	5.0E-01 1.0E-04	I P	V	V	1	0.1				Maleic Hydrazide	123-33-1	3.2E+04 1.8E+03	n n	4.1E+05 2.6E+04	n n	1.0E+04 2.0E+00	n			2.1E+00 4.1E-04	n	
	5.0E-04 3.0E-02	P H	V	V	1	0.1				Malononitrile	109-77-3	6.3E+00 1.9E+03	n n	8.2E+01 2.5E+04	n n	2.0E+00 5.4E+02	n			7.6E-01 n		
	5.0E-03 1.4E-01	I I	5.0E-05 I	V	1	0.1				Maneb	12427-38-2	3.2E+02 1.8E+03	n n	4.1E+03 2.6E+04	n n	9.8E+01 5.2E+02	n n			1.4E-01 2.8E+01	n	
	2.4E-02 5.0E-05	S I	5.0E-05 I	V	1	0.04				Manganese (Diet)	7439-96-5	1.8E+03 2.6E+00	n n	5.2E-02 4.5E+01	n n	2.2E-01 4.3E+02	n			1.8E-02 c*	n	
	9.0E-05 3.0E-02	H I	V	V	1	0.1				Manganese (Non-diet)	7439-96-5	5.7E+00 1.9E+03	n n	7.4E+01 2.5E+04	n n	1.8E+00 6.0E+02	n			2.6E-03 2.0E-01	n	
1.1E-02 P					1		*****			Mephosfolan	950-10-7	5.7E+00 1.9E+03	n n	7.4E+01 2.5E+04	n n	1.8E+00 6.0E+02	n			2.6E-03 1.8E-02	c*	
	9.0E-05 5.0E-03	H I	V	V	1	0.1				Mepiquat Chloride	24307-26-4	3.9E+02 1.4E+03	n n	6.2E+01 2.1E+01	n n	2.0E+00 7.4E+01	n			1.8E-02 c*	n	
	1.0E+00 2.0E-02	X P	V	V	1	0.1				Mercaptobenzothiazole, 2-	149-30-4	4.9E+01 2.1E+02	n c*									
	3.0E-04 2.0E-04	I I	3.0E-04 S V	V	1	0.07	*****			Mercury Compounds	7487-94-7	2.3E+01 1.1E+01	n ns	3.5E+02 4.6E+01	n ns	3.1E-01 3.1E-01	n n	1.3E+00 6.3E-01	n n	2.0E+00 2.0E+00	n n	
	3.0E-04 2.0E-04	I I	3.0E-04 I V	V	1		*****			~Mercury Chloride (and other Mercury salts)	7439-97-6	2.3E+01 1.1E+01	n ns	3.5E+02 4.6E+01	n ns	3.1E-01 3.1E-01	n n	1.3E+00 6.3E-01	n n	3.3E-02 1.0E-01	n n	
	1.0E-04 8.0E-05	I I	V	V	1	0.1				Methyl Mercury	22967-92-6	7.8E+00 5.1E+00	n n	1.2E+02 6.6E+01	n n					1.4E+01 5.0E-04	n	
	3.0E-05 1.0E-04	I O	V	V	1	0.1				Phenylmercuric Acetate	62-38-4	2.3E+00 3.5E+01	n n							5.9E-02 n		
	6.0E-02 1.0E-04	I I	V	V	1	0.1				Merphos	150-50-5	2.3E+00 3.5E+01	n n							6.0E-01 n		
	1.0E-04 6.0E-02	O I	V	V	1	0.1				Merphos Oxide	78-48-8	6.3E+00 3.8E+03	n n	8.2E+01 4.9E+04	n n					1.4E-03 3.3E-01	n	
	5.0E-03 1.0E-04	I I	V	V	1	0.1	*****			Metalaxylyl	57837-19-1	1.1E+02 3.2E+02	n n	1.0E+02 4.1E+03	n n	1.2E+03 3.7E+01	n n			4.3E-04 2.0E+00	n	
	5.0E-05 1.0E-05	I O	V	V	1	0.1				Methacrylonitrile	126-98-7	5.7E+00 1.0E+02	n n	3.1E+01 1.0E+02	n n	1.3E+02 1.9E+00	n n			2.1E-04 n		
	2.0E+00 1.5E-03	I O	V	V	1	0.1	*****			Methamidophos	10265-92-6	3.2E+00 1.1E+01	n ns	4.1E+01 ns	n ns	1.0E+00 nm	n n			4.1E+00 7.1E-03	n	
	2.0E+00 1.5E-03	I O	V	V	1	0.1	*****			Methanol	67-56-1 950-37-8	1.2E+05 9.5E+01	s n	2.1E+06 1.2E+03	s n	8.8E+04 2.9E+01	n n			4.1E+00 5.9E-04	n	
4.9E-02 C	1.4E-05 C				1	0.1	*****			Methomyl	16752-77-5	1.6E+03 1.1E+01	n c	2.1E+04 4.7E+01	n c	5.0E+02 1.5E+00	n c	c*		1.1E-01 5.3E-04	n c	
	5.0E-03 1.0E-03	I I	V	V	1	0.1	*****			Methoxy-5-nitroaniline, 2-	99-59-2 72-43-5	3.2E+02 3.2E+02	n n	4.1E+03 4.1E+03	n n	3.7E+01 3.7E+01	n n			4.0E+01 2.0E+00	n n	
	8.0E-03 5.0E-03	P I	V	V	1	0.1	*****			Methoxyethanol Acetate, 2-	110-49-6 109-86-4	1.1E+02 3.3E+02	n n	5.1E+02 3.5E+03	n n	1.0E+00 2.1E+01	n n	4.4E+00 8.8E+01	n n	2.1E+00 5.9E+03	n	
	1.0E+00 2.0E-02	X P	V	V	1	0.1	*****			Methyl Acetate	79-20-9	7.8E+04 1.5E+02	ns	1.2E+06 2.1E+01	s					4.1E+00 8.9E-03	n	
	2.0E-02 1.0E-02	X P	V	V	1	0.1	*****			Methyl Acrylate	96-33-3	1.5E+02 n	6.1E+02 n	2.1E+01 n	n	8.8E+01 4.2E+01	n n			8.9E-03 n		
1.0E-03 X	6.0E-01 I	V	V	1	0.1	*****			Methyl Ethyl Ketone (2-Butanone)	78-93-3	2.7E+04 1.4E-01	n ns	5.9E+05 1.9E+01	s c**	2.2E+04 2.8E-03	n c**	5.6E+03 5.6E-03	n c**	1.2E+00 1.3E-06	n c**		
	1.0E-03 1.0E-03	P X	V	V	1	0.1	*****			Methyl Hydrazine	60-34-4	2.7E+04 2.6E+01	s c**	5.2E+03 2.8E-03	s c**	2.2E+04 1.2E-02	n c**	5.6E+03 5.6E-03	n c**			
	3.0E+00 2.0E-02	X V	V	1	0.1	*****			Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	3.3E+04 4.6E+00	ns n	1.4E+05 1.9E+01	s n	3.1E+03 1.0E+00	n n	1.3E+04 4.4E+00	n n	6.3E+03 2.1E+00	n n		
	1.4E+00 1.4E+00	I I	7.0E-01 I V	V	1		*****			Methyl Isocyanate	6248-89-9	4.6E+00 4.4E+03	n ns	1.9E+01 1.9E+04	n n	1.0E+00 7.3E+02	n n	4.4E+00 3.1E+03	n n	5.9E-04 3.0E-01	n	
	2.5E-04 6.0E-02	I X	V	V	1	0.1				Methyl Methacrylate	80-62-6	4.4E+03 1.3E+03	n ns	4.9E+04 1.9E+04	n n	4.5E+00 1.2E+03	n			7.4E-03 2.4E-01	n	
	6.0E-03 6.0E-03	I H	V	V	1	0.1	*****			Methyl Parathion	298-00-0	1.6E+01 3.6E+03	n n	2.1E+02 4.9E+04	n n					3.8E-02 n		
	6.0E-02 3.0E-04	C X	V	V	1	0.1	*****			Methyl Phosphonic Acid	99-13-5	3.8E+00 4.2E+01	n n	4.9E+04 4.								

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SFO (mg/kg-day) ⁻¹	Toxicity and Chemical-specific Information								Contaminant								Screening Levels					SSLs	
	k _e	IUR _e	k _e	RfD _e	k _e	RfC _e	k _e	GIAB	S	ABS	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)		
1.8E+01	7.0E-02	H	6.0E-04	I	V	1	1	1	0.1	*****	Methylenediphenyl Diisocyanate	101-68-8	8.5E+05 n ns	3.6E+06 n ns	6.3E-01 n ns	2.6E+00 n ns	7.8E+02 n ns		1.2E+00 n ns	1.2E+00 n ns			
	1.5E-01	I				1	1		0.1	*****	Methylstyrene, Alpha-Methylchlor	98-83-9	5.5E+03 n ns	8.2E+04 n ns			2.7E+03 n ns		3.2E+00 n ns	3.2E+00 n ns			
	2.5E-02	I				1	0.1			*****	Metribuzin	21087-64-9	1.6E+03 n ns	2.1E+04 n ns			4.9E+02 n ns		1.5E-01 n ns	1.5E-01 n ns			
	2.5E-01	I				1	0.1			*****	Metsulfuron-methyl	74223-64-6	1.6E+04 n ns	2.1E+05 n ns			4.9E+03 n ns		1.9E+00 n ns	1.9E+00 n ns			
	3.0E+00	P		V	1	1	3.42E-01	Mineral oils	8012-95-1	2.3E+05 s s	3.5E+06 s s					6.0E+04 n ns		2.4E+03 n ns	2.4E+03 n ns				
	2.0E-01	C	5.1E-03	C	2.0E-04	I	V	1	1	*****	Mirex	2385-85-5	3.6E-02 c n	1.7E-01 c n	5.5E-04 c n	2.4E-03 c n	8.8E-04 c n		6.3E-04 c n				
	2.0E-03	I	5.0E-03	I	1	1	0.1			*****	Molinate	2212-67-1	1.3E+02 n ns	1.6E+03 n ns			3.0E+01 n ns		1.7E-02 n ns				
	1.0E-01	I				1	1			*****	Molybdenum	7439-98-7	3.9E+02 n ns	5.8E+03 n ns			1.0E+02 n ns		2.0E+00 n ns				
1.8E+00	2.0E-03	I	1.0E-03	I	1	1	0.1			*****	Monochloramine	10599-90-3	7.8E+03 n ns	1.2E+05 n ns			2.0E+03 n ns		4.0E+03 n ns				
	2.0E-03	P	1.0E-03	I	1	1	0.1			*****	Monomethylamine	100-61-8	1.3E+02 n ns	1.6E+03 n ns			3.8E+01 n ns		1.4E-02 n ns				
	2.5E-02	I				1	0.1			*****	Myclobutanol	88671-89-0	1.6E+03 n ns	2.1E+04 n ns			4.5E+02 n ns		5.6E+00 n ns				
	3.0E-04	X	1.0E-01	P	V	1	1			*****	N,N'-Diphenyl-1,4-benzenediamine	74-31-7	1.9E+01 n ns	2.5E+02 n ns			3.6E+00 n ns		3.7E-01 n ns				
	2.0E-03	I	2.0E-03	I	V	1	1			*****	Naled	300-76-5	1.6E+02 n ns	2.3E+03 n ns			4.0E+01 n ns		1.8E-02 n ns				
	3.0E-02	X	1.0E-01	P	V	1	1			*****	Naphtha, High Flash Aromatic (HFAN)	64742-95-6	2.3E+03 n ns	3.6E+04 n ns	1.0E+02 n ns	4.4E+02 n ns	1.5E+02 n ns						
	1.2E-01	O				1	0.1			*****	Naphthylamine, 2-	91-59-8	3.0E-01 c n	1.3E+00 c n	2.0E-02 c n	4.7E-02 c n	3.9E-02 c n		2.0E-04 c n				
	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Napropamide	15299-99-7	7.6E+03 n ns	9.8E+04 n ns			2.0E+03 n ns		1.3E+01 n ns				
1.8E+00	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickel Acetate	373-02-4	6.7E+02 n ns	8.1E+03 n ns	1.1E-02 c n	4.7E-02 c n	2.2E+02 c n		4.5E-02 n ns				
	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickel Carbonate	3333-67-3	6.7E+02 n ns	8.1E+03 n ns	1.1E-02 c n	4.7E-02 c n	2.2E+02 c n						
	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickel Carbonyl	13463-39-3	8.2E+02 n ns	1.1E+04 n ns	1.1E-02 c n	4.7E-02 c n	2.2E-02 c n			c**			
	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickel Hydroxide	12054-48-7	8.2E+02 n ns	1.1E+04 n ns	1.1E-02 c n	4.7E-02 c n	2.0E+02 c n			n			
	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickel Oxide	1313-99-1	8.4E+02 n ns	1.2E+04 n ns	1.1E-02 c n	4.7E-02 c n	2.0E+02 c n			n			
	2.4E-04	I	1.1E-02	C	1.4E-05	C	0.04			*****	Nickel Refinery Dust	E715532	8.2E+02 n ns	1.1E+04 n ns	1.2E-02 c n	5.1E-02 c n	2.2E+02 c n			3.2E+01 n ns			
	2.6E-04	C	2.0E-02	H	I	9.0E-05	A	0.04		*****	Nickel Soluble Salts	7440-02-0	1.5E+03 n ns	2.2E+04 n ns	1.1E-02 c n	4.7E-02 c n	3.9E+02 c n			2.6E+01 n ns			
	1.0E-01	I	1.1E-02	C	1.4E-05	C	0.04			*****	Nickel Subsulfide	12035-72-2	4.1E+01 c n	1.9E+00 c n	5.8E-03 c n	2.6E-02 c n	4.5E-02 c n			c			
4.0E-05	2.6E-04	C	1.1E-02	C	1.4E-05	C	1	0.1		*****	Nickelocene	1271-28-9	6.7E+02 n ns	8.1E+03 n ns	1.1E-02 c n	4.7E-02 c n	2.2E+02 c n			n			
	1.6E+00	I	1			1	0.1			*****	Nitrate	14797-56-8	1.3E+06 n ns	1.9E+06 n ns			3.2E+04 n ns		1.0E+04 n ns				
	1.0E-01	I	1.0E-02	X	5.0E-05	X	1	0.1		*****	Nitrate + Nitrite (as N)	E701177	7.8E+03 n ns	1.2E+05 n ns	2.0E-02 n ns	2.2E-01 n ns	1.9E+02 n ns		1.0E+04 n ns	1.0E+03 n ns			
	1.0E-02	X	1.0E-02	X	5.0E-05	X	1	0.1		*****	Nitroaniline, 2-	88-74-4	6.3E+02 n ns	8.0E+03 n ns	5.2E-02 n ns	2.2E-01 n ns	1.9E+02 n ns		8.0E-02 n ns				
	4.0E-05	P	4.0E-03	P	6.0E-03	P	1	0.1		*****	Nitroaniline, 4-	100-01-6	2.7E+01 c n	1.1E+02 c n	6.3E+00 c n	2.6E+01 c n	3.8E+00 c n		1.6E-03 c n				
	2.0E-03	I	2.0E-03	I	9.0E-03	I	V	1	1	*****	Nitrobenzene	98-95-3	5.1E+00 c n	2.2E+01 c n	7.3E-02 c n	3.1E-01 c n	1.4E-01 c n		9.2E-05 c n				
	3.0E+03	P	1.0E-02	I	1	0.1			*****	Nitroc cellulose	9004-70-0	1.9E+08 n ns	2.5E+09 n ns			6.0E+07 n ns		1.3E+04 n ns					
	7.0E-02	H				1	0.1			*****	Nitrofurantoin	67-20-9	4.4E+03 n ns	5.7E+04 n ns			1.4E+03 n ns		6.1E-01 n ns				
1.3E+00	1.3E-02	C	3.7E-04	C	1.0E-04	P	V	1	1	0.1	Nitrofuranone	59-87-0	4.2E-01 c n	1.8E+00 c n	7.6E-03 c n	3.3E-02 c n	6.0E-02 c n		5.4E-05 c n				
	1.7E-02	P	1.0E-04	P	V	1	1			*****	Nitroglycerin	55-63-0	6.3E+00 n ns	8.2E+01 n ns			2.0E+00 n ns		8.5E-04 n ns				
	1.0E-01	I	8.8E-06	P	5.0E-03	P	V	1	1	0.1	Nitroguanidine	556-88-7	6.3E+03 n ns	8.2E+04 n ns			2.0E+03 n ns		4.8E-01 n ns				
	2.7E-03	H	2.0E-03	H	2.0E-02	I	V	1	1	0.1	Nitromethane	75-52-5	5.4E+00 c n	3.2E+01 c n	1.3E-03 c n	4.7E-03 c n	6.4E-01 c n		1.4E-04 c n				
	2.7E+01	C	7.7E-03	C	M	1	0.1			*****	Nitroso-N-ethylurea, N-	759-73-9	4.5E-03 c n	8.5E-02 c n	1.3E-04 c n	3.2E-01 c n	9.2E-04 c n		2.2E-07 c n				
	1.2E+02	C	3.4E-02	C	M	1	0.1			*****	Nitroso-N-methylurea, N-	684-93-5	1.0E-03 c n	1.9E-02 c n	3.0E-05 c n	3.6E-04 c n	2.1E-04 c n		4.6E-08 c n				
	5.4E+00	I	1.6E-03	I	V	1	0.1			*****	Nitroso-di-N-butylamine, N-	914-26-3	9.9E-03 c n	1.8E-03 c n	7.7E-03 c n	2.7E-03 c n			5.5E-06 c n				
	7.0E+00	I	1.0E-03	C	1.0E-03	C	V	1	0.1	0.1	Nitrosodi-N-propylamine, N-	621-64-7	7.8E-02 c n	1.3E-01 c n	6.1E-03 c n	1.1E-02 c n			8.1E-06 c n				
4.9E-03	2.8E+00	I	8.0E-04	C	1.0E-04	P	V	1	1	0.1	Nitrosodiethanolamine, N-	111-16-9	1.9E-01 c n	8.2E-01 c n	3.5E-03 c n	1.5E-02 c n	2.8E-02 c n		5.6E-06 c n				
	1.5E+02	P	1.4E-02	I	V	1	0.1			*****	Nitrosodihydropyrimidine, N-	55-18-5	8.1E-04 c n	1.5E-02 c n	2.4E-05 c n	3.9E-04 c n	1.7E-04 c n		6.1E-08 c n				
	5.1E+01	I	1.4E-02	I	8.0E-06	P	4.0E-05	V	1	0.1	Nitrosodimethylamine, N-	62-75-9	2.0E-03 c n	3.4E-02 c n	7.2E-05 c n	8.8E-04 c n	1.1E-04 c n		2.7E-08 c n				
	4.9E-03	I	2.6E-06	C	1	0.1			*****	Nitrosodiphenylamine, N-	86-30-6	1.1E+02 c n	4.7E+02 c n	1.1E+00 c n	4.7E+00 c n	1.2E+01 c n		6.7E-02 c n					
	2.2E+01	I	1.6E-03	C	V	1	0.1			*****	Nitrosomethylhydrazine, N-	10595-95-6	2.0E-02 c n	9.1E-02 c n	4.5E-04 c n	1.9E-03 c n	7.1E-04 c n		2.0E-07 c n				

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SFO (mg/kg-day) ⁻¹	Toxicity and Chemical-specific Information								Contaminant		Screening Levels						SSLs		
	k _e	IUR _y (ug/m ³) ⁻¹	k _e RfC _y (mg/kg-day) ⁻¹	k _e RfC _y (mg/m ³) ⁻¹	k _v k _o muta- gen	GIAB	S	ABS	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater r (ug/L) key	MCL (ug/L) 1.5E+01(F)	Risk-based SSL (mg/kg) n	MCL-based SSL (mg/kg)
2.2E-03	C 6.3E-07 C	7.0E-04	I	7.0E-04	I	1	1	1		-Perchlorate and Perchlorate Salts	14797-73-0	5.5E+01 n	8.2E+02 n	1.4E+01 n	1.4E+01 n				
		7.0E-04	I	7.0E-04	I	1	1	1		-Potassium Perchlorate	7778-74-7	5.5E+01 n	8.2E+02 n	1.4E+01 n	1.4E+01 n				
		7.0E-04	I			1	0.1			-Sodium Perchlorate	7601-89-0	5.5E+01 n	8.2E+02 n	1.4E+01 n	1.4E+01 n				
		2.0E-02	P			1	0.1			Perfluorobutane sulfonic acid (PFBS)	375-73-5	1.3E+03 n	1.6E+04 n	4.0E+02 n	4.0E+02 n			1.3E-01 n	
		2.0E-02	P			1	0.1			Perfluorobutanesulfonate	45187-15-3	1.3E+03 n	1.6E+04 n	4.0E+02 n	4.0E+02 n			1.3E-01 n	
		5.0E-02	I			1	0.1			Permethrin	52645-53-1	3.2E+03 n	4.1E+04 n	1.0E+03 n	1.0E+03 n			2.4E+02 n	
		2.4E-01	O			1	0.1			Phenacetin	62-44-2	2.5E+02 c	1.0E+03 c	4.5E+00 c	1.9E+01 c			9.7E-03 c	
		3.0E-01	I	2.0E-01	C	1	0.1			Phenmedipham	13684-63-4	1.5E+04 n	2.0E+05 nm	3.8E+03 n				2.1E+01 n	
		4.0E-03	I			1	0.1			Phenol	108-95-2	1.9E+04 n	2.5E+05 n	2.1E+02 n	8.8E+02 n			3.3E+00 n	
		5.0E-04	X			1	0.1			Phenol, 2-(1-methylethoxy)-, methylcarbamate	114-26-1	2.5E+02 n	3.3E+03 n	7.8E+01 n				2.5E-02 n	
										Phenothiazine	92-84-2	3.2E+01 n	4.1E+02 n		4.3E+00 n			1.4E-02 n	
1.2E-01	P	2.0E-04	X	V	1		#####			Phenyl Isothiocyanate	103-72-0	1.6E+01 n	2.3E+02 ns					1.7E-03 n	
		6.0E-03	I			1	0.1			Phenylenediamine, m-	108-45-2	3.8E+02 c	4.9E+03 c	1.2E+02 n				3.2E-02 n	
1.9E-03	H	4.0E-03	P			1	0.1			Phenylenediamine, o-	95-54-5	4.5E+00 c	9.9E+01 c					1.7E-04 c	
		1.0E-03	X			1	0.1			Phenylenediamine, p-	106-50-3	6.3E+01 n	8.2E+02 n					5.4E-03 n	
		2.0E-04	H			1	0.1			Phenylphenol, 2- Phorate	90-43-7	2.8E+02 n	3.2E+03 c	3.0E+01 n				4.1E-01 c	
						1	0.1	#####		Phosgene	75-44-5	3.1E-01 n	3.8E+00 n	3.1E-01 n	1.3E+00 n			3.4E-03 n	
		2.0E-02	I			1	0.1	#####		Phosmet	732-11-6	1.3E+03 n	1.6E+04 n		3.7E+02 n			8.2E-02 n	
										Phosphates, Inorganic									
4.9E+01	P	4.9E+01	P			1				-Aluminum metaphosphate	13776-88-0	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Ammonium polyphosphate	68333-79-9	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Calcium pyrophosphate	7790-76-3	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Diammonium phosphate	7783-28-0	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Dicalcium phosphate	7757-93-9	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Dimagnesium phosphate	7782-75-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Dipotassium phosphate	7758-11-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Disodium phosphate	7558-79-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Monoaluminum phosphate	13530-50-2	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Monocalcium phosphate	7722-76-1	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Monocalcium phosphate	7758-23-8	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Monomagnesium phosphate	7757-86-0	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Monopotassium phosphate	7778-77-0	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Monosodium phosphate	7558-80-7	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Polyphosphoric acid	8017-16-1	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Potassium tripolyphosphate	13845-36-8	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Sodium acid pyrophosphate	7758-16-9	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Sodium aluminum phosphate (acidic)	7785-88-8	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Sodium aluminum phosphate (anhydrous)	10279-59-1	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Sodium aluminum phosphate (tetrahydrate)	10305-76-7	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Sodium hexametaphosphate	10124-56-8	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Sodium polyphosphate	68915-31-1	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Sodium trimetaphosphate	7785-84-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Sodium tripolyphosphate	7758-29-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Tetrapolassium phosphate	7320-34-5	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Tetrasodium pyrophosphate	7222-88-5	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Triangular sodium tetra decahydrogen octaphosphate (dihydrate)	15136-87-5	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Tricalcium phosphate	7758-87-4	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Trimagnesium phosphate	7757-87-1	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Tripotassium phosphate	7778-53-2	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Trisodium phosphate	7302-34-5	3.8E+06 n	5.7E+07 nm						
4.9E+01	P	4.9E+01	P			1				-Dithiophosphate, di-	7222-88-5	3.8E+06 n	5.7E+07 nm						
		4.9E+01	P			1				-Octyl Phthalate	117-84-0	6.3E+02 n	8.2E+03 n						
4.9E+01	P	4.9E+00	H			1	0.1			-Phthalic Acid -P-	100-21-0	6.3E+04 n	8.2E+05 nm						
		4.9E+00	P			1	0.1			-Phthalic Anhydride	85-44-9	1.3E+05 n	1.6E+06 n	2.1E+01 n	8.8E+01 n	1.9E+04 n		6.8E+00 n	
4.9E+01	P	4.9E+00	I			1	0.1			Picloram	1918-02-1	4.4E+03 n	5.7E+04 n	2.1E+01 n	1.4E+01 n	1.4E+03 n		3.8E-01 n	1.4E-01
		4.9E+00	I			1	0.1			Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.3E+00 n	8.2E+01 n					1.3E-03 n	
		4.9E+00	X			1	0.1			Picramic Acid (2,4,6-trinitrophenol)	88-89-1	5.7E+01 n	7.4E+02 n					8.4E-02 n	
		4.9E+00	X			1	0.1			Pirimiphos Methyl	29232-93-7	4.4E+00 n	5.7E+01 n					8.5E-01 n	
3.0E+01	C	8.6E-03	C	7.0E-06	H	1	0.1			Polybrominated Biphenyls Polychlorinated Biphenyls (PCBs)	50536-65-1	1.8E-02 c	7.7E-02 c	3.3E-04 c	1.4E-03 c	2.6E-03 c*		c*	
		7.0E-02	S	2.0E-05	S	7.0E-05	I	V	1	0.14	-Aroclor 1016</td								

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Toxicity and Chemical-specific Information										Contaminant					Screening Levels						SSLs	
SFO (mg/kg-day) y ⁻¹	k _e	IUR (ug/m ³) y ⁻¹	k _l	RfD _y	k _e	RfC _y	k _v	k _o	muta-	GIAB	C _{sat} (mg/kg)	Contaminant	CAS No.	Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)	
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 157)	69782-90-7							1.7E-03 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4							1.7E-03 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												~Hexachlorobiphenyl, 3,3',4,4',5'- (PCB 169)	32774-16-6							1.7E-06 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3							1.0E-03 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												Pentachlorobiphenyl, 2,3,4,4',5- (PCB 118)	31508-00-6							1.0E-03 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4							1.0E-03 c		
3.9E+00 E 1.1E-03 E 2.3E-05 E 1.3E-03 E V 1 0.14												Pentachlorobiphenyl, 2,3,4,4',5' (PCB 114)	74472-37-0							1.0E-03 c		
1.3E+04 E 3.8E+00 E 7.0E-09 E 4.0E-07 E V 1 0.14												Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8							3.0E-07 c		
2.0E+00 E 1.5E-04 E 1 0.14												Polychlorinated Biphenyls (high risk)	1336-36-3							5.0E-01		
4.0E-01 I 1.0E-04 I V 1 0.14												Polychlorinated Biphenyls (low risk)	1336-36-3							1.0E-03 c		
7.0E-02 I 2.0E-05 I V 1 0.14												Polychlorinated Biphenyls (lowest risk)	1336-36-3							1.0E-03 c		
1.3E+01 E 3.8E-03 E 7.0E-06 E 4.0E-04 E V 1 0.14												Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3							9.4E-04 c*		
3.9E+01 E 1.1E-02 E 2.3E-06 E 1.3E-04 E V 1 0.14												Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4							6.2E-05 c		
												Polymeric Methylenediphenyl Diisocyanate (PMDI)	9016-87-9									
												Polynuclear Aromatic Hydrocarbons (PAHs)		8.5E+05 nm	3.6E+06 nm	6.3E-01 n	2.6E+00 n					
6.0E-02 I 3.0E-01 I V 1 0.13												Aceanaphthalene	83-32-9							5.5E+00 n		
3.0E-01 I V M 1 0.13												Anthracene	120-12-7							5.8E+01 n		
1.0E-01 E 6.0E-05 E 3.0E-01 I V M 1 0.13												Benz[a]anthracene	56-55-3							1.1E-02 c		
1.2E+00 C 1.1E-04 C 1 0.13												Benzofluoranthene	205-62-3							7.8E-02 c		
1.0E+00 I 6.0E-04 I 3.0E-04 I 2.0E-06 I M 1 0.13												Benz[a]pyrene	50-32-8							2.9E-02 c	2.4E-01	
1.0E-01 E 6.0E-05 E 1 0.13												Benz[b]fluoranthene	205-99-2							3.0E-01 c		
1.0E-02 E 6.0E-06 E 1 0.13												Benz[k]fluoranthene	207-08-9							2.9E+00 c		
												Chloronaphthalene, Beta-	91-58-7							3.9E+00 n		
1.0E-03 E 6.0E-07 E 1 0.13												Chrysene	218-01-9							9.0E+00 c		
1.0E+00 E 6.0E-04 E 1 0.13												Dibenzo[a,h]anthracene	53-70-3							9.6E-02 c		
1.2E+01 C 1.1E-03 C 1 0.13												Dibenzo(a,e)pyrene	192-65-4							8.4E-02 c		
2.5E+02 C 7.1E-02 C 1 0.13												Dimethylbenz(a)anthracene, 7,12-	57-97-6							9.9E-05 c		
4.0E-02 I 4.0E-02 I V 1 0.13												Fluoranthene	206-44-0							8.9E+01 n		
												Fluorene	86-73-7							5.4E+00 n		
1.0E-01 E 6.0E-05 E 1 0.13												Indeno[1,2,3-cd]pyrene	193-39-5							9.8E-01 c		
2.9E-02 P 7.0E-02 A V 1 0.13 #####												Methylaphthalene, 1-	90-12-0							6.0E-03 c		
4.0E-03 I 4.0E-03 I V 1 0.13												Methylaphthalene, 2-	91-57-6							1.9E-01 n		
3.4E-05 C 2.0E-02 I 3.0E-03 I V 1 0.13												Naphthalene	91-20-3							5.4E-04 c*		
1.2E+00 C 1.1E-04 C 1 0.13												Nitropyrrene, 4-	57835-92-4							3.3E-03 c		
3.0E-02 I 2.0E-02 P V 1 0.13												Pyrrene	129-00-0							1.3E+01 n		
2.0E-02 P 2.0E-02 I V 1 0.13												Potassium Perfluorobutane Sulfonate	29420-49-3							4.0E+02 n		
1.5E-01 I 9.0E-03 I V 1 0.1												Prochloraz	67747-09-5							1.9E-03 c		
6.0E-03 H 16.0E-02 V 1 0.1												Profluralin	26399-36-0							1.6E+00 n		
1.5E-02 I 16.0E-18-0 V 1 0.1												Prometon	1610-18-0							1.2E+01 n		
4.0E-02 O 1 0.1												Prometryn	7287-19-6							9.0E-01 n		
1.3E-02 I 1 0.1												Propachlor	9118-16-7							1.5E-01 n		
5.0E-03 I 1 0.1												Propanal	709-98-8							4.5E-02 n		
1.9E-01 O 4.0E-02 O 1 0.1												Propargite	2312-35-8							1.1E-02 c		
2.0E-03 I 2.0E-02 I V 1 0.1												Propargyl Alcohol	107-19-7							8.1E-03 n		
2.0E-02 I 1.3E-03 I V 1 0.1												Propargazine	139-40-2							3.0E-01 n		
1.0E-01 O 1 0.1												Propiconazole	122-42-9							2.2E-01 n		
												Propionaldehyde	60207-90-1							5.3E+00 n		
8.0E-03 I V 1 0.1												Propiconazole	123-38-6							3.4E-03 n		
1.0E-01 X 1.0E+00 X V 1 #####												Propyl benzene	103-65-1							1.2E+00 n		
3.0E+00 C 3.0E+00 C V 1 0.1												Propylene	115-07-1							6.0E+00 n		
2.0E+01 P 1 0.1												Propylene Glycol	57-55-6							8.1E+01 n		
												Propylene Glycol Dinitrate	6423-43-4	3.9E+05 nm	1.6E+06 nm	2.8E-01 n	1.2E+00 n					
7.0E-01 H 2.0E+00 I V 1 #####												Propylene Glycol Monomethyl Ether	107-98-2							6.5E-01 n		
3.0E-02 I V 1 0.1												Propylene Oxide	75-56-9							5.6E-05 c		
7.5E-02 I 1 0.1												Propyzamide	23950-58-5							1.2E+00 n		
1.0E-03 I V 1 0.1												Pyridine	110-86-1							6.8E-03 n		
5.0E-04 I 1 0.1												Quinalphos	13593-03-8							4.3E-02 n		
3.0E+00 I 9.0E-03 I V 1 0.1												Quinoline	91-22-5							7.8E-05 c		
												Quinalophen-ethyl	76578-14-8							1.9E+00 n		
3.0E-02 I 1 0.1												Refractory Ceramic Fibers	E715557							1.9E+00 n		
5.0E-02 H 1 0.1												Resmethrin	10453-86-8							4.2E+01 n		
5.0E-03 I 1 0.1												Ronnel	299-84-3							3.7E+00 n		
4.0E-03 I 1 0.1												Rotenone	83-79-4							3.2E+01 n		
2.2E-01 C 6.3E-05 C M 1 0.1												Safrole	94-59-7							5.9E-05 c		
5.0E-03 I 1 0.04												Selenious Acid	7783-00-8							1.0E-02 c		
5.0E-03 I 2.0E-02 C 1 0.1												Selenium	7782-49-2							n		
5.0E-																						

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Contaminant																								
Toxicity and Chemical-specific Information								Analyte								Resident Soil (mg/kg) key	Industrial Soil (mg/kg) key	Resident Air (ug/m ³) key	Industrial Air (ug/m ³) key	Tapwater r (ug/L) key	MCL (ug/L)	Risk-based SSL (mg/kg) key	MCL-based SSL (mg/kg)	
SFO (mg/kg-day) 2.4E-02 H	k _e 3.0E-02 I	IUR (ug/m ³) 6.0E-01 y	k _e RfC, I	k _v (mg/m ³) 1.0E+00 y	k _e GIABr S	muta- gen	GIAB S	ABS 0.1	C _{sat} (mg/kg)	Stirofos (Tetrachlorovinphos) Strontium, Stable	CAS No. 9611-15 7440-24-6													
										Strychine	57-24-9	1.9E+01 4.7E+04 n	2.5E+02 7.0E+05 n	n	n	n	5.9E+00 1.2E+04 n	n		6.5E-02 1.0E+00 n	n			
										Styrene	100-42-5	6.0E+03 1.9E+02 n	3.5E+04 2.5E+03 n	ns	1.0E+03 1.2E+03 n	n	1.2E+03 4.8E+01 n	1.0E+02		6.5E-02 1.3E+00 1.1E-01				
										Styrene-Acrylonitrile (SAN) Trimer														
										Sulfolane	126-33-0	6.3E+01 5.1E+01 1.4E+06	8.2E+02 6.6E+02 6.0E+06	n	2.1E+00 1.0E+00 nm	n	8.8E+00 4.4E+00 n	2.0E+01 1.1E+01 2.1E+00	n		4.4E-03 6.5E-02 n			
										Sulffonyl bis(4-chlorobenzene), 1,1'-	80-07-9													
										Sulfur Trioxide	7446-11-9													
										Sulfuric Acid	7664-93-9	1.4E+06 2.2E+01 1.9E+03	6.0E+06 9.2E+01 2.5E+04	n	1.0E+00 4.0E-01 n	n	4.4E+00 1.7E+00 c	1.3E+00 4.8E+02 n			1.5E-02 3.3E+00 n			
										Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethyl ethyl)phenoxy]-1-methylethyl	140-57-8													
										TCMTB	21564-17-0													
										Tebuthiuron	34014-18-1	4.4E+03 2.0E+01 8.2E+02	5.7E+04 1.3E+03 1.1E+04	n	n	n	1.4E+03 4.0E+02 2.5E+02	n		3.9E-01 7.6E+01 7.5E-02				
										Temephos	3383-96-8													
										Terbacil	5902-51-2													
										Turbafos	13071-79-9	2.0E+00 6.3E+01 6.3E+00	2.9E+01 8.2E+02 8.2E+01	n	2.4E-01 1.3E+01 2.0E+00	n	2.4E-01 1.3E+01 2.0E+00	n		5.2E-04 1.9E-02 5.3E-02				
										Terbutryn	886-50-0													
										Tetrabromodiphenyl ether, 2,2',4,4'-(BDE-47)	5436-43-1													
										Tetrachlorobenzene, 1,2,4,5-	95-94-3													
										Tetrachloroethane, 1,1,1,2-	630-20-6													
										Tetrachloroethane, 1,1,2,2-	79-34-5	2.0E+00 6.0E-01	3.5E+02 2.7E+00	n	3.8E-01 4.8E-02	c	1.7E+00 2.1E-01	c	1.7E+00 7.6E-02	5.1E-03 1.8E-01 4.5E-06	c** 2.3E-03			
										Tetrachloroethylene	127-18-4	2.4E+01 5.0E-02	1.0E+02 2.5E+04	c**	1.1E+01 4.7E+01	c**	1.1E+01 4.7E+01	c**	1.1E+01 5.0E-02	5.0E+00				
										Tetrachlorophenol, 2,3,4,6-	58-90-2													
										Tetrachlorotoluene, p-, alpha, alpha-	5216-25-1													
										Tetrachloro- <i>D</i> ithiophosphate	3689-24-5	3.2E+01 8.0E+01	4.1E+02 n	n	7.1E+00 7.1E+00	n	7.1E+00 7.1E+00	n	5.2E-03 n					
										Tetrafluoroethane, 1,1,1,2-	811-97-2	1.0E+05 479-45-8	4.3E+05 n	s	8.3E+04 2.3E+03	n	3.5E+05 3.9E+01	n	9.3E+01 3.7E-01	n				
										Tetra(Trinitrophenyl)methylnitramine)														
										Thallic Oxide	1314-32-5													
										Thallium (I) Nitrate	10102-45-1	1.6E+00 10102-45-1	2.3E+01 7.8E-01	n	4.0E-01 2.0E-01	n	4.0E-01 2.0E-01	n						
										Thallium (Soluble Salts)	7440-28-0													
										Thallium Acetate	563-68-8													
										Thallium Carbonate	653-73-9													
										Thallium Chloride	7791-12-0													
										Thallium Selenite	12039-52-0	7.8E-01	1.2E+01	n	2.0E-01	n	2.0E-01	n						
										Thallium Sulfate	7446-18-6	1.6E+00 2.3E+01	2.3E+01 n	n	4.0E-01 2.0E-01	n	4.0E-01 2.0E-01	n						
										Thifensulfuron-methyl	7927-27-3	2.7E+03 3.5E+04	3.5E+04 n	n	8.6E+02	n	8.6E+02	n	2.6E-01					
										Thiobencarb	28249-77-6	6.3E+02 111-48-8	8.2E+03 5.4E+03	n	1.6E+02 1.4E+03	n	1.6E+02 1.4E+03	n	5.5E-01 2.8E-01					
										Thiodiglycol	111-48-8													
										Thifanoxan	39196-18-4													
										Thiophanate, Methyl	23564-05-8	4.7E+01 1.0E+02	2.0E+02 c	c	4.7E+01 2.1E-01	c	6.7E+00 1.2E+04	c	5.7E-03 4.2E-01	c*				
										Thiram	137-26-8	9.5E+02 1.2E+04	1.2E+02 7.0E+05	n	2.9E+02 1.2E+04	c	2.9E+02 1.2E+04	c	3.0E-03 n					
										Tin	7440-31-5	4.7E+04 8.0E-01	7.0E+05 n	n										
										Titanium Tetrachloride	7550-45-0	1.4E+05 8.0E-02	6.0E+05 6.4E+04	nm	1.0E-01 2.2E+04	n	4.4E-01 1.1E+03	n	1.0E+03 2.5E-04	1.0E+03	7.6E-01 n	6.9E-01		
										Toluene	108-88-3	4.9E+03 6.4E+04	4.7E+04 2.7E+01	ns	5.2E+03 8.3E-03	n	2.2E+04 3.5E-02	n	1.1E+03 1.7E-02					
										Toluene-2,4-disiocyanate	584-84-9													
										Toluene-2,5-diamine	95-70-5	3.0E+00 91-08-7	1.3E+01 2.2E+01	c**	1.3E+01 8.3E-03	c	4.3E-01 3.5E-02	n	1.7E-02 9.0E+01		1.3E-04 2.6E-04	c**		
										Toluene-2,6-disiocyanate	99-94-5	3.2E+02 99-94-5	4.1E+03 n	n	1.2E+01 2.5E+02	c	1.7E-02 5.3E+00	n	2.3E-02 n					
										Toluidine, p-	95-53-4	3.4E+01 1.8E+01	1.4E+02 7.7E+01	c	5.5E-02 c**	c	2.4E-01 2.5E+00	c	4.7E+00 1.1E-03	c	2.0E-03 c*			
										Toluidine, o-(Methylaniline, 2-)	106-49-0													
										Total Petroleum Hydrocarbons (Aliphatic High)	E1790670	2.3E+05 6.0E-01	s	3.5E+06 ns	s	6.0E+04 n					2.4E+03			
										Total Petroleum Hydrocarbons (Aliphatic Low)	E1790666	5.2E+02 1.0E-02	s	2.2E+03 ns	6.3E+02 ns	n	2.6E+03 1.3E+03	n			8.8E+00 1.5E+00			
										Total Petroleum Hydrocarbons (Aliphatic Medium)	E1790668	9.6E+01 4.0E-02	4.4E+02 ns	ns	1.0E+02 4.4E+02	n	4.4E+02 n	1.0E+02 n			8.9E+01			
										Total Petroleum Hydrocarbons (Aromatic High)	E1790676	2.5E+03 9.0E-02	s	3.3E+04 ns	3.3E+04 n	n					8.0E+02			
										Total Petroleum Hydrocarbons (Aromatic Low)	E1790672	8.2E+01 4.0E-02	4.2E+02 ns	n	3.1E+01 2.8E+04	n	1.3E+02 2.2E+04	n	3.3E+01 2.7E+01		1.7E-02 n			
										Total Petroleum Hydrocarbons (Aromatic Medium)	E1790674	1.1E+02 4.0E-03	6.0E+02 ns	n	3.1E+00 2.3E+01	n	1.3E+01 1.3E+01	n	5.5E+00 n		2.3E-02 n			
										Toxaphene	8001-35-2	4.9E-01 1.2E+00	2.1E+00 c	c	8.8E-03 7.1E-02	c	3.8E-02 c	c	3.0E+00	3.0E+00				
										66841-25-6	4.7E+02 6.0E-01	n	2.6E+03 3.5E+02	n	4.0E-01 3.7E+00	n	1.5E+02 4.5E+02	n		5.8E-01 8.2E-02				
										688-73-3	2.3E+01 5.1E+06	n	3.5E+02 6.6E+07	n	3.5E+02 1.6E+06	n								
										Triacetin	102-76-1													
										Triadimenol	43121-43-3	2.1E+03 9.7E+00												

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Toxicity and Chemical-specific Information								Contaminant								Screening Levels				SSLs						
SFO (mg/kg-day) ⁻¹	k _e	IUR y/(ug/m ³) ⁻¹	k _e	RfD _x y/(mg/kg-day)	k _e	RfC _x y/(mg/m ³)	k _e	o	v	muta-	GIAB	S	ABS	C _{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Resident Air (ug/m ³)	Industrial Air (ug/m ³)	Tapwate r (ug/L)	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)		
1.1E-02	I 3.1E-06 I	V	3.0E-01	I	V	1	0.1	#####								Trichlorofluoromethane	75-69-4	2.3E+04	ns	3.5E+05	s	5.2E+03	n	3.3E+00	n	
			1.0E-01	I	V	1	0.1	#####								Trichlorophenol, 2,4,5-	95-95-4	6.3E+03	n	8.2E+04	n	1.2E+03	n	4.0E+00	n	
			1.0E-02	I	P	1	0.1	#####								Trichlorophenol, 2,4,6-	88-06-2	4.9E+01	c**	2.1E+02	c**	9.1E-01	c	4.0E+00	c**	
3.0E+01	I	V	1.0E-02	I	V	1	0.1	#####								Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	6.3E+02	n	8.2E+03	n	1.6E+02	n	6.8E-02	n	
			8.0E-03	I	V	1	0.1	#####								Trichlorophenoxypropionic acid, 2,4,5	93-72-1	5.1E+02	n	6.6E+03	n	1.1E+02	n	6.1E-02	n	
			5.0E-03	I	V	1	0.1	#####								Trichloropropane, 1,1,2-	598-77-6	3.9E+02	n	5.8E+03	ns	8.8E+01	n	5.0E+01	2.8E-02	
			4.0E-03	I	3.0E-04 I	V	M	1	#####								Trichloropropane, 1,2,3-	96-18-4	5.1E-03	c	1.1E-01	c	3.1E-01	n	1.3E+00	n
			3.0E-03	X	3.0E-04 P	V	V	1	#####								Trichloropropene, 1,2,3-	96-19-5	7.3E-01	n	3.1E+00	n	1.3E+00	n	6.2E-01	n
			2.0E-02	A	V	1	0.1	#####								Tricresyl Phosphate (TCP)	1330-78-5	1.3E+03	n	1.6E+04	n	1.6E+02	n	1.5E+01	n	
7.7E-03	I	V	3.0E-03	I	7.0E-03 I	V	V	1	#####								Tridiphane	58138-08-2	1.9E+02	n	2.5E+03	n	1.8E+01	n	1.3E-01	n
			7.0E-03	P	V	1	0.1	#####								Triethylamine	12144-8	1.2E+02	n	4.8E+02	n	7.3E+00	n	3.4E-03	n	
			2.0E+00	P	V	1	0.1	#####								Triethylene Glycol	112-27-6	1.3E+05	nm	1.6E+06	nm	4.0E+04	n	8.8E+00	n	
			2.0E+01	P	V	1	0.1	#####								Trifluoroethane, 1,1,1-	420-46-2	1.5E+04	ns	6.2E+04	n	2.1E+04	n	4.2E+04	n	
			7.5E-03	I	V	1	0.1	#####								Trifluralin	1582-09-8	9.0E+01	c**	4.2E+02	c*	2.6E+00	c*	8.4E-02	c*	
			1.0E-02	P	V	1	0.1	#####								Trimethyl Phosphate	512-56-1	2.7E+01	c*	1.1E+02	c*	3.9E+00	c*	8.6E-04	c*	
			1.0E-02	I	6.0E-02 I	V	V	1	#####								Timethylbenzene, 1,2,3-	526-73-8	3.4E+02	ns	2.0E+03	ns	6.3E+01	n	2.6E+02	n
			1.0E-02	I	6.0E-02 I	V	V	1	#####								Timethylbenzene, 1,2,4-	95-63-6	3.0E+02	n	1.8E+03	ns	6.3E+01	n	2.6E+02	n
3.0E-02	I	V	1.0E-02	I	6.0E-02 I	V	V	1	#####								Timethylbenzene, 1,3,5-	108-67-8	2.7E+02	ns	1.5E+03	ns	6.3E+01	n	2.6E+02	n
			1.0E-02	X	V	1	0.1	#####								Timethylpentene, 2,4,4-	25167-70-8	7.8E+02	c	1.2E+04	ns	1.2E+04	c	6.5E+01	n	
			3.0E-02	I	V	1	0.019	#####								Tinitrobenzene, 1,3,5-	99-35-4	2.2E+03	n	3.2E+04	ns	5.9E+02	n	2.1E+00	n	
			5.0E-04	I	V	1	0.032	#####								Tinitrotoluene, 2,4,6-	118-96-7	2.1E+01	c**	9.6E+01	c*	2.5E+00	c**	1.5E-02	c**	
			2.0E-02	P	V	1	0.1	#####								Triphenylphosphine Oxide	791-28-6	1.3E+03	n	1.6E+04	n	3.6E+02	n	1.5E+00	n	
			2.0E-02	A	V	1	0.1	#####								(tri(1,3-Dichloro-2-propyl) Phosphate	13674-87-8	1.3E+03	n	1.6E+04	n	3.6E+02	n	8.0E+00	n	
			1.0E-02	X	V	1	0.1	#####								(tri(1-chloro-2-propyl) phosphate	13674-84-5	6.3E+02	n	1.2E+03	n	1.9E+02	n	6.5E-01	n	
1.0E+00	C	V	2.3E+00	C	6.6E-04	C	V	1	#####								Tris(2,3-dibromopropyl)phosphate	126-72-7	2.8E-01	c	1.3E+00	c	4.3E-03	c	1.9E-02	c
			2.0E-02	P	V	1	0.1	#####								Tris(2-chloroethyl)phosphate	115-96-8	2.7E+01	c*	1.1E+02	c*	3.8E+00	c*	3.8E-03	c*	
			3.2E-03	P	V	1	0.1	#####								Tris(2-ethylhexyl)phosphate	78-42-2	1.7E+02	c	7.2E+02	c	2.4E+01	c	1.2E+02	c*	
			8.0E-04	P	V	1	0.1	#####								Tungsten	7440-33-7	6.3E+01	n	9.3E+02	n	1.6E+01	n	2.4E+00	n	
			2.0E-04	A	4.0E-05	A	V	1	#####								Uranium (Soluble Salts)	E715665	1.6E+01	n	2.3E+02	n	4.2E-02	n	4.0E+00	n
			1.0E-04	C	2.9E-04	C	M	1	#####								Urethane	61-79-6	1.2E+01	c	2.3E+00	c	3.5E-03	c	2.5E-02	c
			8.3E-03	P	V	1	0.1	#####								Vanadum Pentoxide	1314-62-1	4.6E+02	c**	2.0E+03	c**	3.4E-04	c*	1.5E-03	c*	
			5.0E-03	I	7.0E-06	P	V	0.026	#####								Vanadium Compounds	7440-62-2	3.9E+02	n	5.8E+03	n	4.2E-02	n	8.6E+01	n
			5.0E-03	S	1.0E-04	P	V	0.026	#####								Yermolate	1929-77-7	7.8E+01	n	1.2E+03	n	4.4E-01	n	1.1E+01	n
			1.2E-03	O	V	1	0.1	#####								Vinclozolin	50471-44-8	7.6E+01	n	9.8E+02	n	2.1E+02	n	2.1E+01	n	
			1.0E+00	H	2.0E-01	I	V	1	#####								Vinyl Acetate	108-05-4	9.1E+02	n	3.8E+03	n	2.1E+02	n	4.1E+02	n
3.2E-05	H	V	1.0E+00	H	2.0E-01	I	V	1	#####								Vinyl Bromide	593-60-2	1.2E-01	c*	5.2E-01	c*	8.8E-02	c*	3.8E-01	c*
			3.0E-03	O	V	1	0.1	#####								Vinyl Chloride	75-01-4	5.9E-02	c	1.7E+00	c	1.7E-01	c	2.8E+00	c	
			3.0E-04	I	V	1	0.1	#####								Warfarin	81-81-2	1.9E+01	n	2.5E+02	n	5.6E+00	n	5.9E-03	n	
			2.0E-01	S	1.0E-01	S	V	1	#####								Xylene, P-	106-42-3	5.6E+02	ns	2.4E+03	ns	1.0E+02	n	1.9E+02	n
			2.0E-01	S	1.0E-01	S	V	1	#####								Xylene, m-	108-38-3	5.5E+02	ns	2.4E+03	ns	1.0E+02	n	4.4E+02</td	

Table 1. Region 4 Waste Management Division Freshwater Surface Water Screening Values for Hazardous Waste Sites[1]**Priority Pollutants**

Compound	Acute Screening Values (ug/L)	Chronic Screening Values (ug/L)
Antimony	1300 (2s)	160 (2s)
Arsenic III	360*	190*
Beryllium	16 (6s)	0.53 (1s)
Cadmium2	1.79*	0.66*
Chromium (III)2	984.32*	117.32*
Chromium (VI)	16*	11*
Copper2	9.22*	6.54*
Lead2	33.78*	1.32*
Mercury	2.40*	0.012* ³
Nickel2	789.00*	87.71*
Selenium	20.00*	5.00*
Silver2	1.23*	0.012(1s)
Thallium	140.00(3s)	4.00 (2s)
Zinc2	65.04*	58.91*
Cyanide	22*	5.2*
2,3,7,8-TCDD-Dioxin	0.1	0.00001 ³
Acrolein	6.8(3s)	2.1 (1s)
Acrylonitrile	755 (4s)	75.5
Benzene	530 (7s)	53
Bromoform	2930 (2s)	293
Carbon Tetrachloride	3520 (3s)	352
Chlorobenzene	1950 (5s)	195
2-Chloroethylvinyl Etheru	35400 (1s)	3540
Chloroform	2890 (3s)	289
1,2-Dichloroethane	11800 (3s)	2000 (1s)
1,1-Dichloroethylene	3030 (3s)	303
1,2-Dichloropropane	5250 (3s)	525
1,3-Dichloropropylene (cis and trans)	606 (2s)	24.4 (1s)

Ethylbenzene	4530 (5s)	453
Methyl Bromide	1100 (1s)	110
Methyl Chloride	55000 (1s)	5500
Methylene Chloride	19300 (3s)	1930
1,1,2,2-Tetrachloroethane	932 (3s)	240 (1s)
Tetrachloroethylene	528 (5s)	84 (1s)
Toluene	1750 (5s)	175
1,2-Trans-Dichloroethylene	13500 (1s)	1350
1,1,1-Trichloroethane	5280 (2s)	528
1,1,2-Trichloroethane	3600(3s)	940(1s)
2-Chlorophenol	438 (5s)	43.8
2,4-Dichlorophenol	202 (3s)	36.5 (1s)
2,4-Dimethylphenol	212 (3s)	21.2
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-O-Cresol)	23 (4s)	2.3
2,4-Dinitrophenol	62 (3s)	6.2
2-Nitrophenol	-	3500
4-Nitrophenol	828 (3s)	82.8
3-Methyl-4-Chlorophenol(P-Chloro-M-Cresol)	3 (1s)	0.3
Pentachlorophenol⁴ (pH 7.8)	20 *	13*
Phenol	1020(16s)	256 (1s)
2,4,6-Trichlorophenol	32 (3s)	3.2
Acenaphthene	170 (2s)	17
Benzidine	250 (4s)	25
Bis(2-Chloroethyl) Ether	23800 (1s)	2380
Bis(2-Ethylhexyl) Phthalate	1110 (2s)	<0.3 (2s)
4-BromophenylPhenyl Ether	36(2s)	12.2 (1s)
Butylbenzyl Phthalate	330(4s)	22 (2s)
1,2-Dichlorobenzene	158(4s)	15.8 (3s)
1,3-Dichlorobenzene	502(3s)	50.2
1,4-Dichlorobenzene	112(5s)	11.2
Diethyl Phthalate	5210(2s)	521
Dimethyl Phthalate	3300(2s)	330
Di-n-Butyl Phthalate	94(6s)	9.4

2,4-Dinitrotoluene	3100(2s)	310
1,2-Diphenylhydrazine	27(2s)	2.7
Fluoranthene	398(2s)	39.8
Hexachlorobutadiene	9(5s)	0.93(1s)
Hexachlorocyclopentadiene	0.7(4s)	0.07
Hexachloroethane	98(5s)	9.8
Isophorone	11700(2s)	1170
Naphthalene	230(4s)	62(1s)
Nitrobenzene	2700(2s)	270
N-Nitrosodiphenylamine	585(2s)	58.5
1,2,4-Trichlorobenzene	150(4s)	44.9 (1s)
Aldrin	3*	0.3
a-BHC	-	500[5]
b-BHC	-	5000[5]
g-BHC (Lindane)	2*	0.08*
Chlordane	2.4*	0.0043* ³
4,4'-DDT	1.1*	0.001*
4,4'-DDE	105(1s)	10.5
4,4'-DDD	0.064(8s)	0.0064
Dieldrin	2.5*	0.0019* ³
a-Endosulfan	0.22*	0.056*
b-Endosulfan	0.22*	0.056*
Endrin	0.18*	0.0023* ³
Heptachlor	0.52*	0.0038* ³
Heptachlor Epoxide	0.52*	0.0038* ³
PCB-1242	0.2(7s)	0.014*
PCB-1254	0.2(7s)	0.014*
PCB-1221	0.2(7s)	0.014*
PCB-1232	0.2(7s)	0.014*
PCB-1248	0.2(7s)	0.014*
PCB-1260	0.2(7s)	0.014*
PCB-1016	0.2(7s)	0.014*
Toxaphene	0.73*	0.0002* ³

Non-Priority Pollutants

Compound	Acute Screening Values (ug/L)	Chronic Screening Values (ug/L)
Aluminum (pH 6.5 -9.0)	750*	87*
Boron	-	750 * ⁶
Chloride	860,000*	230,000*
Chlorine (TRC)	19*	11*
Chloropyrifos	0.083*	0.041*
Demeton	-	0.1*
Guthion	-	0.01*
Iron	-	1000*
Malathion	-	0.1*
Methoxychlor	-	0.03*
Mirex	-	0.001*
Oil and Grease	-	0.01* Low LC ₅₀
Parathion	0.065*	0.013*
Pentachlorobenzene	250	50
pH	-	6.5 -9.0*
Sulfide (S ₂ -, HS-)	-	2*
1,2,4,5-Tetrachlorobenzene	250	50
Tributyltin	-	0.026

[1] Based on Region 4 Water Management Division, Water Quality Standards Unit's Screening List.

Hardness (mg/L as CaCO₃): 50.0

pH: 6

*: Criteria

s: Number of Species

[2] Hardness Dependent Based on the following equations:

Compound	Acute Screening Value	Chronic Screening Value
Cadmium	e ^{(1.128(lnH)-3.828)}	e ^{(0.7825(lnH)-3.49)}
Chromium III	e ^{(0.819(lnH)+3.688)}	e ^{(0.819(lnH)+1.561)}
Copper	e ^{(0.9422(lnH)-1.464)}	e ^{(0.8545(lnH)-1.465)}
Lead	e ^{(1.273(lnH)-1.46)}	e ^{(1.273(lnH)-4.705)}
Nickel	e ^{(0.846(lnH)+3.3612)}	e ^{(0.846(lnH)+1.1645)}
Silver	e ^{(1.72(lnH)-6.52)}	
Zinc	e ^{(0.8473(lnH)+0.8604)}	e ^{(0.8473(lnH)+0.7614)}

[3] Based on the marketability of fish. The use of other values which may have greater ecological significance may be considered.

[4] pH Dependent. Based on the following equation:

Compound	Acute Screening Value	Chronic Screening Value
Pentachlorophenol	$e^{(1.005pH-4.83)}$	$e^{(1.005pH-5.29)}$

[5] Lowest plant value reported

[6] For long term irrigation of sensitive crops (minimum standard)

Table 3. Region 4 Waste Management Division Sediment Screening Values for Hazardous Waste Sites.**Metals (ppm)**

Chemical Analyte	Effects Value	CLP PQL¹	Screening Value
Antimony	2 ²	12	12
Arsenic	7.24 ³	2	7.24
Cadmium	0.676 ³	1	1
Chromium	52.3 ³	2	52.3
Copper	18.7 ³	5	18.7
Lead	30.2 ³	0.6	30.2
Mercury	0.13 ³	0.02	0.13
Nickel	15.9 ⁴	8	15.9
Silver	0.733 ³	2	2
Zinc	124 ³	4	124

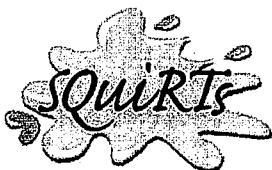
Organics (ppb)

Chemical Analyte	Effects Value	CLP PQL¹	Screening Value
p,p'- DDD	1.22 ³	3.3	3.3
DDD	2 ²	3.3	3.3
p,p'- DDE	2.07 ³	3.3	3.3
DDE	2 ²	3.3	3.3
p,p'- DDT	1.19 ³	3.3	3.3
DDT	1 ²	3.3	3.3
Total DDT	1.58 ⁴	3.3	3.3
Chlordane	0.5 ²	1.7	1.7
Dieldrin	0.02 ²	3.3	3.3
Endrin	0.02 ²	3.3	3.3
Lindane(gamma- BHC)	0.32 ³	3.3	3.3
Total PCBs	21.6 ³	33(67for Aroclor1221)	33(67for Aroclor1221)
Bis(2-ethylhexyl)phthalate	182 ³	3.6	182
Acenaphthene	6.71 ³	330	330
Acenaphthylene	5.87 ³	330	330

Anthracene	46.9 ³	330	330
Fluorene	21.2 ³	330	330
2- Methyl Naphthalene	20.23	330	330
Naphthalene	34.6 ³	330	330
Phenanthrene	86.7 ³	330	330
Low Molecular Weight PAHs	312 ³	330	330
Benzo(a)anthracene	74.8 ³	330	330
Benzo(a)pyrene	88.8 ³	330	330
Chrysene	108 ³	330	330
Dibenzo(a,h)anthracene	6.22 ³	330	330
Fluoranthene	113 ³	330	330
Pyrene	153 ³	330	330
High Molecular Weight PAHs	655 ³	330	655
Total PAHs	1684 ³	330	1684
Dioxin (ng/kg)			2.5

1. Contract Laboratory Program Practical Quantification Limit
2. Long, Edward R., and Lee G. Morgan. 1991. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52
3. MacDonald, D.D. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters. Florida Department of Environmental Protection.
4. Long, Edward R., Donald D. MacDonald, Sherri L. Smith, and Fred D. Calder. 1995. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management 19(1):81-97.
5. USEPA. 1993. Interim Report on Data and Methods for Assessment of 2,3,7,8 - Tetrachlorodibenzo-p-dioxin Risks to Aquatic Life and Associated Wildlife. EPA/600/R-93/055.

(Adobe PDF Reader Required)**Table 4. Region 4 Waste Management Division Soil Screening Values for Hazardous Waste Sites (PDF, 87K)**



Screening Quick Reference Tables

These tables were developed for screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

This set of NOAA Screening Quick Reference Tables, or SQuRTs, presents screening concentrations for inorganic and organic contaminants in various environmental media. Additional reference material, such as guidelines for sample preservation, are also included.

NOAA identifies potential impacts to coastal resources and habitats likely to be affected by hazardous wastes. To screen for substances which may threaten natural resources of concern to NOAA, environmental concentrations are compared to these screening levels. These tables are intended for preliminary screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. NOAA does not endorse their use for any other purposes. Screening levels are reported with the number of significant figures they were originally reported with.

In this new version, column headings link to OR&R's web site where brief descriptions of the benchmark may be found. However, detailed guidance on the recommended application of various screening guidelines is provided in the original sources (listed in each SQuRT section, with web links for many). Users of the SQuRT cards are strongly encouraged to review supporting documentation to determine appropriateness for their specific use.

The SQuRT card set has been re-organized from earlier versions to accommodate expansion. Benchmarks from numerous new sources have been incorporated, and the list of analytes vastly increased. The SQuRT cards present benchmarks representing different degrees of protectiveness. Multiple benchmarks are also provided in many cases: the user is advised to review the derivation of any particular benchmark before selecting a specific value. Information is still presented in sections, with *new sections* appearing in this expanded version:

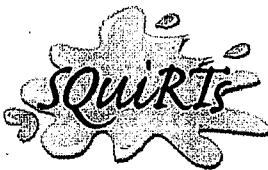
- Inorganics in Sediment (freshwater and marine)
- Inorganics in Water (groundwater and surface water)
- Organics in Water and Soil
- *Toxic Equivalency Factors*
- Guidelines for Sample Collection & Storage
- Analytical Methods for Inorganics
- Inorganics in Soil
- Organics in Sediment
- *PCB Composition*
- *Composition by Carbon Range*
- Analytical Methods for Organics

Footnotes within each SQuRT section which appear at the bottom of the page are only to aid in deciphering the nature of specific entries. Due to space constraints, notations which relate to the source for individual values are explained at the end of the section. Organic chemicals are now listed alphabetically, without categorization. A few synonyms are provided, but CAS numbers are also presented to aid in identifying and finding specific analytes. Except as noted, all concentrations in the SQuRT cards are in parts per billion.

For surface water samples, because releases from hazardous waste sites are often continuous and long-term, concentrations are most often compared directly with chronic benchmarks, when available. Groundwater concentrations are also screened against chronic benchmarks. However, suitable site-specific dilution factors should be applied to allow for dilution upon migration and discharge of groundwater to surface water. The SQuRT cards present U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs), applicable to drinking water sources and secondary MCLs applicable to groundwater, supplemented by values from Canada and the United Nations World Health Organization.

Preference for surface water and groundwater benchmarks is given to U.S. EPA Ambient Water Quality Criteria (AWQC). This is generally followed by Tier II Secondary Acute Values (SAVs) or available standards and guidelines from other regulatory agencies. Tier II SAVs are derived using a similar approach to AWQC, but do not have sufficient supporting data for full criteria calculation. Lowest Observable Effect Levels (LOELs) were originally published by EPA with AWQC. Around 2000, EPA stopped publishing these values, however, LOELs are reproduced here when no other benchmark is available, because in many instances, they formed the basis for state standards.

For many trace elements, AWQC are now expressed in terms of the "dissolved" fraction, which is essentially defined operationally as a filtered fraction. Likewise, the toxicity of many trace elements is related to the water hardness, and the values presented are for a default hardness of 100 mg/L CaCO₃. Equations are provided in the SQuRT cards to calculate the exact criteria for a given hardness, or, to convert from unfiltered, total concentrations to "dissolved" fractions.



Screening Quick Reference Table for Inorganics in Sediment

These tables were developed for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

Analyte	FRESHWATER SEDIMENT								MARINE SEDIMENT								
	"Background" ¹	ARCS <i>H. azteca</i> TEL ²	TEC ³	TEL ³	LEL ⁴	PEC ³	PEL ³	SEL ⁴	UET ¹	T ₂₀ ⁵	TEL ⁶	ERL ⁶	T ₅₀ ⁵	PEL ⁶	ERM ⁶	AET ⁷	
Predicted Toxicity Gradient:								Increasing									
Aluminum (%)	Al	0.26%	2.55%													1.8% N	
Antimony	Sb	160														9,300 E	
Arsenic	As	1,100	10,798	9,790	5,900	6,000	33,000	17,000	33,000	17,000 I	7,400	7,240	8,200	20,000	41,600	70,000	
Barium	Ba	700														48,000 A	
Cadmium	Cd	100-300	583	990	596	600	4,980	3,530	10,000	3,000 I	380	680	1,200	1,400	4,210	9,600	
Chromium	Cr	7,000-13,000	36,286	43,400	37,300	26,000	111,000	90,000	110,000	95,000 H	49,000	52,300	81,000	141,000	160,000	370,000	
Cobalt	Co	10,000					50,000+									10,000 N	
Copper	Cu	10,000-25,000	28,012	31,600	35,700	16,000	149,000	197,000	110,000	86,000 I	32,000	18,700	34,000	94,000	108,000	270,000	
Iron (%)	Fe	0.99-1.8 %	18.84%				2%				4%	4% I				22% N	
Lead	Pb	4,000-17,000	37,000	35,800	35,000	31,000	128,000	91,300	250,000	127,000 H	30,000	30,240	46,700	94,000	112,000	218,000	
Manganese	Mn	400,000	630,000				460,000				1,100,000	1,100,000 I				260,000 N	
Mercury	Hg	4-51		180	174	200	1,060	486	2,000	560 M	140	130	150	480	700	710	
Nickel	Ni	9,900	19,514	22,700	18,000	16,000	48,600	36,000	75,000	43,000 H	15,000	15,900	20,900	47,000	42,800	51,600	
Selenium	Se	290														1,000 A	
Silver	Ag	<500					500 +				4,500 H	230	730	1,000	1,100	1,770	3,700
Strontium	Sr	49,000															
Tin	Sn	5,000														> 3,400 N	
Vanadium	V	50,000														57,000 N	
Zinc	Zn	7,000-38,000	98,000	121,000	123,000	120,000	459,000	315,000	820,000	520,000 M	94,000	124,000	150,000	245,000	271,000	410,000	
Lead 210	bq/g dw						0.5 ^			< 9.7 ^							
Polonium 210	bq/g dw						0.6 ^			< 8.7 ^							
Radium 226	bq/g dw						0.1 ^			< 13 ^							
Sulfides										130,000 M						4,500 MO	

- Based on SLC approach using sensitive species HC5%; ES&T 2005 39(14):5148-5156.

* - Based upon EQp approach using current AWQC CCC

^ - Based on SLC approach to derive LEL and SEL; Env'l Monitor & Ass'ment 2005 110:71-85

+ - Carried over from Open Water disposal Guidelines; treated as if LEL for management decisions.

Bioassay endpoints: M – Microtox; B – Bivalve; E – Echinoderm larvae; O – Oyster larvae;

A – Amphipod; N – Neanthes; L – Larval bioassay; plus, I – Infaunal community impacts

Sources

1 – Buchman, M. 1999. NOAA HAZMAT Report 99-1.

2 – EPA 905-R96-008

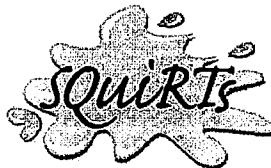
3 – Arch ET&C 2000, 39(1)20- TEL and PEL are also known as Canadian ISQGs and PELs

4 – Guidelines for the protection and management of aquatic sediment quality in Ontario Aug 1993

5 – ET&C 2002, 21(9)1993-

6 – Ecotox. 1996, 5(4):253-

7 – Chapter 173-204 WAC, 1991/95 as supplemented by WA Dept of Ecology staff with unpublished data.



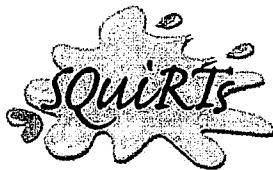
Screening Quick Reference Table for Inorganics in Soil

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A N A L Y T E All concentrations in parts per billion dry weight unless specified otherwise	C A S Number	B A C K G R O U N D ¹		D U T C H S T A N D A R D S ²		E c o - S S L ³					
		Mean	Range	Target	Intervention	A v i a n	I n v e r t s	M a m m a l s	P l a n t s	M i c r o b e s ⁴	
Aluminum	Al	7429905	4.70%	0.5- >10%					50,000 a	600,000	
Antimony	Sb	7440360	480	bd-8,800	3,000	15,000	78,000	142 v	5,000 a		
Arsenic	As	7440382	5,200	bd-97,000	900 L	55,000	43,000	60,000 a	5,700 v	18,000	100,000
Barium	Ba	7440393	440,000	10,000-0.5%	160,000	625,000		330,000	1,040 v	500,000 a	3,000,000
Beryllium	Be	7440417	630	bd-15,000	1,100	30,000 S	40,000	1,060 v	10,000 a		
Boron	B	7440428	26,000	bd-300,000					500 a	20,000	
Bromine	Br	7726956	560	bd-11,000	20,000				10,000 a		
Cadmium	Cd	7440439			800	12,000	770	20,000 a	2.22 v	4,000 a	20,000
Chromium III	Cr	7440473	< 37,000	1,000-0.2%	< 380 L	< 220,000 L	26,000	<400 a	34,000	< 1,000 a	< 10,000
Chromium VI	Cr	18540299	< 37,000		< 380 L	< 220,000 L		400 a	81,000	< 1,000 a	< 10,000
Cobalt	Co	7440484	6,700	bd-70,000	2,400 L	180,000 L	120,000		140 v	13,000	1,000,000
Copper	Cu	7440508	17,000	bd-700,000	3,400 L	96,000 L	28,000	50,000 a	5,400 v	70,000	100,000
Cyanide (total complex)	CN	57125			5,000	50,000 (pH>5)			1,330 v		
Cyanide (total free)	CN				1,000	20,000					
Fluorine	F	7782414	210,000	bd-0.37%	500,000				200,000 a	30,000	
Iodine	I	7553562	750	bd-9,600					4,000 a		
Iron	Fe	7439896	1.80%	0.01- >10%						200,000	
Lanthanum	La	7439910	30,000	bd-200,000						50,000	
Lead	Pb	7439921	16,000	bd-700,000	55,000 L	530,000	11,000	500,000 a	53.7 v	50,000 a	900,000
Lithium	Li	7439932	20,000	bd-140,000						2,000 a	10,000
Manganese	Mn	7439965	330,000	bd-0.7%			4,300,000		4,000,000	220,000	100,000
Mercury	Hg	7439976	58	bd-4,600	300	10,000		100 a v	300 a	30,000	
Mercury(methyl)		22967926			37 L	4,000 L		< 100 a v	1.58 v	< 300 a	
Molybdenum	Mo	7439987	590	bd-15,000	3,000	190,000 L			2,000 a	200,000	
Nickel	Ni	7440020	13,000	bd-700,000	260 L	100,000 L	210,000	200,000 a	13,600 v	30,000 a	90,000
Selenium	Se	7782492	260	bd-4,300	700 L	100,000 S	1,2000	4,100	630	520	100,000
Silver	Ag	7440224				15,000 S	4,200		4,040 v	2,000 a	50,000
Strontium	Sr	7440246	120,000	bd-0.3%					3.58 v		
Sulfide		18496258								200 a	
Sulfur	S	7704349	0.12%	bd-4.8%							
Technetium	Tc	7440268									

1: bd – below detection

2: S – serious contamination level; L – Environmental Risk Limit



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ANALYTE All concentrations in parts per billion dry weight unless specified otherwise		CAS Number	BACKGROUND ¹		DUTCH STANDARDS ²		Eco-SSL ³				Microbes ⁴
			Mean	Range	Target	Intervention	Avian	Inverts	Mammals	Plants	
Tellurium	Te	13494809			600,000						
Thallium	Tl	7440280	8,600	2,20-31,000	1,000	15,000 S			56.9 v	1,000 a	
Tin	Sn	7440315	890	bd-10,000	19,000 background	900,000 S			7,620 v	50,000 a	2,000,000
Titanium	Ti	7440326	0.224 %	0.007-2 %		< 2,500					1,000,000
Tin as Triphenyltin		668348									
Tungsten	W	7440337									400,000
Uranium	U	7440611	2,300	290-11,000						5,000 a	
Vanadium	V	7440622	58,000	bd-500,000	42,000	250,000 S	7,800		1,590 v	2,000 a	20,000
Zinc	Zn	7440666	48,000	bd-0.29%	16,000 L	350,000 L	46,000	6,620 v		50,000 a	100,000

Sources

1 – USGS Prof. Paper 1270, 1984. Mean is geometric mean of national data.

2 – Entry is lower of current VROM Environmental Quality standards or the updated RIVM Environmental Risk Limits. Risk limits are typically divided by 100 to derive the Target value; this computation has not been done here.

Dutch Target/Intervention: E.M.J. Verbruggen, R. Posthumus and A.P. van Wezel, 2001. Ecotoxicological Serious Risk Concentrations for soil, sediment, and (ground)water: Updated proposal for first series of compounds. Nat. Inst. Public Health and the Env., and subsequent updates as published elsewhere.

Min. Housing, Spatial Plan. And the Env., 2000. Annexes Circular on target values and intervention values for soil remediations.

3 – Entry is lower of either:

EPA Eco-SSLs, www.epa.gov/ecotox/ecoss/

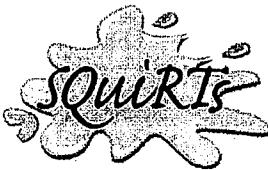
a – ORNL Screening benchmark for earthworms and soil microorganisms: ORNL 1997a, [ES/ER/TM-126/R2](http://es.er.doe.gov/ER/TM-126/R2)

v – EPA R5 Eco Screening levels soil - shrew or vole, www.epa.gov/reg5rcra/ca/

4 - ORNL 1997b, [ES/ER/TM-85/R3](http://es.er.doe.gov/ER/TM-85/R3).

1: bd – below detection

2: S – serious contamination level; L – Environmental Risk Limit



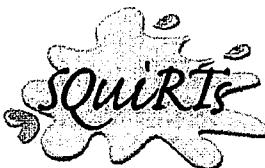
Screening Quick Reference Table for Inorganics in Water

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ELEMENT All concentrations in parts per billion unless specified otherwise		GROUND WATER ¹	SURFACE WATERS ²			
			Freshwater		Acute	Marine
		Acute	Chronic		Chronic	
Aluminum	Al	50-200 *	pH 750	pH 87		
Antimony	Sb	6	88 p	30 p	1,500 p	500 p
Arsenic III	As ⁺³	<10		190 E		2.3 NZ
Arsenic V	As ⁺⁵	<10	66 T	3.1 T	2,319 *	
Arsenic, Total	As	10	340	150	69	36
Barium	Ba	2,000	110 T	3.9 E	1,000 BC	200 BC
Beryllium	Be	4	35 T	0.66 T	1,500 BC	100 BC
Boron	B	5,000 C	30 T	1.6 T		1,200
Cadmium	Cd	5	2.0 †	0.25 †	40	8.8
Chromium III	Cr ⁺³	<100	570 †	74 †	10,300 *	27.4 NZ
Chromium VI	Cr ⁺⁶	<100	16	11	1,100	50
Chromium, Total	Cr	100				
Cobalt	Co		1,500 T	3.0 E		1 NZ
Copper	Cu	1,300	13 †	9 †	4.8	3.1
Fluoride	F	4,000	200 BC(hardness < 50)		1,500 BC	
Gallium	Ga			18 NZ		use 18 NZ
Iron	Fe	300 *		1,000	300 BC	50 BC
Lanthium	La			0.04 NZ		
Lead	Pb	15	65 †	2.5 †	210	8.1
Lithium	Li		260 T	14 T		
Manganese	Mn	50 *	2,300 T	80 E		100 BC
Mercury	Hg	2	1.4	0.77	1.8	0.94
Methyl Mercury			0.099 T	0.0028 T		
Molybdenum	Mo	70 W	16,000 T	34 NZ		23 NZ
Nickel	Ni	20 W	470 †	52 †	74	8.2
Phosphorus	P					0.1
Potassium	K		373,000 BC			
Selenium	Se	50	13-186 total	5 total	290	71
Silver	Ag	100 *	1.6 (½) †	0.36 T	0.95 (½)	
Strontium	Sr		15,000 T	1,500 T		
Thallium	Tl	2	110 T	0.03 NZ	2,130 *	17 NZ
Tin as TBT			0.46	0.072	0.42	0.0074

1: * - Secondary standard

2: pH - criteria is pH dependent ; p - proposed; † - hardness dependent; * - EPA LOEL ; (½) - CMC is halved to compare to 1985 Guideline derivation



Screening Quick Reference Table for Inorganics in Water

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ELEMENT All concentrations in parts per billion unless specified otherwise	GROUND WATER ¹	SURFACE WATERS ²			
		Freshwater		Marine	
		Acute	Chronic	Acute	Chronic
Tin as Di-N-Butyl		0.08 BC			
Tin as Triethyl		0.4 BC			
Tin as Triphenyl		0.022 BC		34 BC	
Titanium	Ti	2,000 BC			
Uranium	U	30	46 T	500 BC	100 BC
Vanadium	V	5,000 *	280 T	19 E	50 BC
Zinc (Zn)	Zn		120 †	120 †	81
Zirconium	Zr		310 T	17 T	
Hydrogen Sulfide			2	2	
Cyanide, free	CN	200	22	5.2	1

Freshwater criterion for certain elements (†) are expressed as a function of hardness (mg/L) in the water column. The values shown assume 100 mg/L. Values for a different hardness may be calculated using the following equations to arrive at a CMC or CCC for filtered samples. Hardness may range up to 400 mg/L as calcium carbonate. For hardness above this range, use 400 mg/L as the maximum value allowed. For salinity between 1 and 10 ppt, use the more stringent of either fresh or marine values.

Sources

1 – Primary entry is the US EPA MCL value, followed by the WHO drinking water guidelines.

Maximum Contaminant Levels (MCLs): <http://www.epa.gov/safewater/index.html>

W – World Health Organization's (WHO) Drinking water guidelines: http://www.who.int/water_sanitation_health/dwq/en/

C – Canadian water Quality Guidelines: <http://www.ec.gc.ca/CEQQ-RCQE/English/Ceqg/Water/default.cfm>

2 – Primary entry is the US Ambient Water Quality Criteria, followed by the lowest of Tier II SAVs or available standards and guidelines.

EPA Ambient water Quality Criteria (AWQC): <http://www.epa.gov/waterscience/criteria/aglife.html>

T – Tier II Secondary Acute Value: <http://www.esd.ornl.gov/programs/ecorisk/tools.html>

BC – British Columbia Water Quality Guidelines (either working or recommended): <http://www.env.gov.bc.ca/wat/wq/>

NZ – Australian & New Zealand ECLs and Trigger values: ANZECC Oct 2000, Volume 1, The Guidelines. www.mfe.govt.nz/publications/

E – EcoUpdate: www.epa.gov/oswer/riskassessment/ecoup/

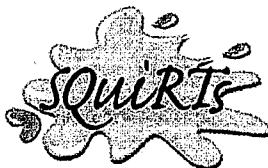
Lowest Observable Effect Levels (LOELs) previously published by EPA are also included since these essentially were the basis for many state standards.

EPA LOELs: EPA Water quality Criteria Summary, Office of Science & Technology, Health & Ecological Criteria Div., Ecological Risk Assessment Branch, 1991.

Full listings appeared in various Fed. Register notices and in EPA's Quality Criteria for Water, 1992.

1: * – Secondary standard

2: pH – criteria is pH dependent ; p - proposed; † - hardness dependent; * - EPA LOEL ; (½) - CMC is halved to compare to 1985 Guideline derivation



Screening Quick Reference Table for Inorganics in Water

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ELEMENT	HARDNESS CALCULATIONS - UNFILTERED FRESHWATER CRITERIA		UNFILTERED TO FILTERED CALCULATIONS		
	CMC	CCC	Fresh water CMC	Freshwater CCC	Marine CMC / CCC
Arsenic (As)			1	1	1
Cadmium (Cd)	$CMC = e^{1.0166 [\ln(\text{hardness})] - 3.924}$	$CCC = e^{0.7409 [\ln(\text{hardness})] - 4.719}$	$CF = 1.136672 - 0.041838 [\ln(\text{hardness})]$	$CF = 1.101672 - 0.041838 [\ln(\text{hardness})]$	$CF = 0.994$
Chromium III (Cr+3)	$CMC = e^{0.819 [\ln(\text{hardness})] + 3.7256}$	$CCC = e^{0.819 [\ln(\text{hardness})] + 0.6848}$	$CF = 0.316$	$CF = 0.860$	—
Chromium VI (Cr+6)			$CF = 0.982$	$CF = 0.962$	$CF = 0.993$
Copper (Cu)	$CMC = e^{0.9422 [\ln(\text{hardness})] - 1.7}$	$CCC = e^{0.8545 [\ln(\text{hardness})] - 1.702}$	$CF = 0.960$	$CF = 0.960$	$CF = 0.83$
Lead (Pb)	$CMC = e^{1.273 [\ln(\text{hardness})] - 1.46}$	$CCC = e^{1.273 [\ln(\text{hardness})] - 4.705}$	$CF = 1.46203 - 0.145712 [\ln(\text{hardness})]$	SAME AS CMC	$CF = 0.951$
Mercury (Hg)			$CF = 0.85$	$CF = 0.85$	$CF = 0.85$
Nickel (Ni)	$CMC = e^{0.846 [\ln(\text{hardness})] + 2.255}$	$CCC = e^{0.846 [\ln(\text{hardness})] + 0.0584}$	$CF = 0.998$	$CF = 0.997$	$CF = 0.990$
Selenium (Se)			—	—	$CF = 0.998$
Silver (Ag)	$CMC = e^{1.72 [\ln(\text{hardness})] - 6.52}$	CCC — No criteria	$CF = 0.85$	—	$CF = 0.85 / -$
Zinc (Zn)	$CMC = e^{0.8473 [\ln(\text{hardness})] + 0.884}$	$CCC = e^{0.8473 [\ln(\text{hardness})] + 0.884}$	$CF = 0.978$	$CF = 0.986$	$CF = 0.946$

Freshwater criterion for certain elements are expressed as a function of hardness (mg/L) in the water column. The values shown assume 100 mg/L. Values for a different hardness may be calculated using the above equations to arrive at a CMC or CCC for *filtered* samples. Hardness may range up to 400 mg/L as calcium carbonate. For hardness above this range, use 400 mg/L as the maximum value allowed.

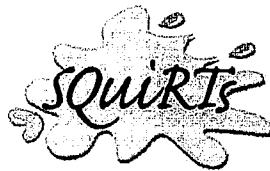
Criteria for most metals are expressed as standards for samples filtered through 0.45 m filter (*i.e.*, "dissolved"). To convert unfiltered concentrations to filtered, multiply the unfiltered concentration value by the appropriate Conversion Factor (CF) above. For cadmium and lead, the conversion factor itself is hardness-dependent.

CMC: Criteria Maximum Concentration is the highest level for a 1-hour average exposure not to be exceeded more than once every three years, and is synonymous with "acute."

CCC: for a 4-day average exposure not to be exceeded more than once every three years, and is synonymous with "chronic."

Sources

EPA Ambient water Quality Criteria (AWQC): <http://www.epa.gov/waterscience/criteria/aqlife.html>



Screening Quick Reference Tables for Organics - Sediment

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A N A L Y T E	C A S N u m b e r	F R E S H W A T E R S E D I M E N T							D U T C H S e d i m e n t s ⁵		M A R I N E S E D I M E N T							Eco Tox EqP ⁹ @1%TOC
		A R C S <i>H y a l e l l a</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸
2,3,7,8-TCDD dioxin TEQs	1746016	0.00085 c			0.0215 c			0.0088†H		1 S		19	0.00085 c		0.0215 c	0.0036 N		
Acenaphthene	83329	6.71 c			88.9 c			290 M				14	6.71	16	88.9	500	130 E	
Acenaphthylene	208968	5.87 c			128 c			160 M					5.87	44	140	128	640	71 E
Acrylonitrile	107131									0.07	100 S							
Aldrin	309002			2				80	40 I	0.06	1,700 LB							
Aldrin + Dieldrin + Endrin	na									5	140 L							9.5 AE
Anthracene	120127	10	46.9 c	57.2	220	245 c	845	3,700	260 M	39 LB	1,600 LB	34	46.9	85.3	290	245	1,100	280 E
Atrazine	1912249									0.2	710 LB							
BCH compounds (sum)	na									10	6,400 L							
Benz[a]anthracene	56553	15.72	31.7	108	320	385	1,050	14,800	500 I	25 L	2,500 L	61	74.8	261	466	693	1,600	960 E
Benzene	71432									10	1,000							57
Benzo(ghi)perylene	191242				170					570 LB	33,000 LB	67						670 M
Benzo[a]pyrene	50328	32.4	31.9	150	370	782	1,450			3,200	300 M	69	88.8	430	520	763	1,600	1,100 E
Benzo[b]fluoranthene	205992									700 I	52 L	7,000 L	130					1,800 E I
Benzo[k]fluoranthene	207089	27.2			240					13,400	13,400B	70						1,800 E I
Benzoic acid	65850																	65 O
Benzyl alcohol	100516																	52 B
BHC, alpha (α -HCH)	319846				6					100		3	< 2,000					
BHC, beta (β -HCH)	319857				5					210		9	< 2,000					
BHC, delta (δ -HCH)	319868											< 10	< 2,000					
BHC, gamma- (γ -HCH; Lindane)	58899	0.94	2.37	3	1.38	4.99	10	9 I	0.05		1,200 L	17	0.32		0.99		> 4.8 N	3.7
Biphenyl	92524																	1,100
Bis(2-ethylhexyl)phthalate (DEHP)	117817									750 †M	< 100	10,000 LB						1,300 I
Bromoform (Tribromomethane)	75252											75,000						650
Butanol	35296721											30,000 S						
Butyl acetate, 1- or 2-	na											200,000 S						
Butyl benzyl phthalate	85687											< 100	48,000 LB					
Carbaryl	63252											0.03	450 LB					
Carbofuran	1563662											0.02	17 LB					
Carbon tetrachloride (Tetrachloromethane; Tetra)	56235											170 EB	1,000					1,200

4: Entry is lowest, reliable value among AET tests, on 1% TOC basis; I - Infaunal community impact ; M - Microtox bioassay ; H - *Hyalella azteca* bioassay ; † - value on dry weight basis.

5: S - Serious Contamination; L - Environmental Risk Limit for soil; LB - Environmental Risk Limit for soil or bedded sediment

8: Entry is lowest value among AET tests: I - Infaunal community impact ; A - Amphipod ; B - Bivalve ; M- Microtox bioassay ; O - Oyster larvae ; E - Echinoderm larvae ; L - Larval_{max} ; or , N - *Neanthes* bioassay.



Screening Quick Reference Tables for Organics - Sediment

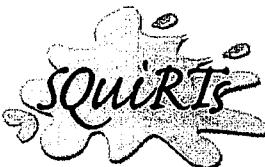
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ANALYTE	CAS Number	FRESHWATER SEDIMENT							DUTCH Sediment ⁵		MARINE SEDIMENT							Eco Tox Eq ⁶ @1%TOC
		ARCS <i>Hyalella azteca</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸
Catechol (o-Dihydroxybenzene)	120809									3.2 LB	2,600 LB							
Chlordane	57749	4.5	3.24	7	8.9	17.6	60	30 I		0.03	4,000							
Chlordane (alpha)	5103719									< 0.03	< 4,000							
Chlordane (gamma)	5103742									< 0.03	< 4,000							
Chloro, 4- 2-methyl phenol	1570645										< 15,000 S							
Chloro, 4- 2-methylphenoxy acetic acid (MCPA)	94746									0.05	4,000							
Chloro, 4- 3-methyl phenol	59507										< 15,000 S							
Chloro, 4- methyl phenols	na										15,000 S							
Chloroaniline	27134265									5	50,000							
Chlorobenzenes (sum)	na									30	30,000							820
Chloroform (trichloromethane)	67663									20	10,000							
Chloronaphthalene, 1-	90131									57 LB	< 10,000							
Chloronaphthalene, 2-	91587									250 LB	< 10,000							0.333
Chlorophenol, 2-	95578									55 LB	7,800 LB							
Chlorophenol, 3-	108430									35 L	14,000 L							
Chlorophenol, 4-	106489									20 LB	1,400 LB							
Chlorophenols (sum)	na									10	10,000							
Chrysene	218019	26.83	57.1	166	340	862	1,290	4,600	800 I	8,100 LB	35,000 LB	82	108	384	650	846	2,800	950 E
Cresol [m-] (3-Methyl phenol)	108394									1,600 L	16,000 L							
Cresol [o-] (2-Methyl phenol)	95487									500 L	50,000 L							8 B
Cresol [p-] (4-Methyl phenol)	106445									5.1 LB	2,600 LB							100 B
Cresols, sum	1319773									50	5,000							
Cyclohexanone	108941									100	45,000							
DDD, 4,4- (p,p-DDD, TDE)	72548	3.54	4.88	8	8.51	28	60	< 60 I	3.9 LB	34,000 LB		1.22	2		7.81	20	< 16 I	
DDE, 4,4- (p,p-DDE)	72559	1.42	3.16	5	6.75	31.3	190	< 50 I	5.8 LB	1,300 LB		2.07	2.2		374	27	< 9 I	
DDT, 4,4- (p,p-DDT)	50293	1.19 c	4.16	8	4.77 c	62.9	710	50 I	9.8 LB	1,000 L		1.19	1		4.77	7	< 12 E	
DDT+DDE+DDD (sum)	na	7	5.28	7	4,450	572	120	50 I	10	4,000		3.89	1.58		51.7	46.1	11 B	
Diazinon	333415											19	6.22	63.4	113	135	260	230 OM
Dibenz[ah]anthracene	53703	10	6.22 c	33	60	135 c		1,300	100 M									110 E
Dibenzofuran	132649									5,100 H								2,000

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5: S - Serious Contamination; L - Environmental Risk Limit for soil; LB - Environmental Risk Limit for soil or bedded sediment

8: Entry is lowest value among AET tests: I - Infaunal community impact ; A - Amphipod ; B - Bivalve ; M- Microtox bioassay ; O - Oyster larvae ; E - Echinoderm larvae ; L - Larval_{max} ; or , N - *Neanthes* bioassay.



Screening Quick Reference Tables for Organics - Sediment

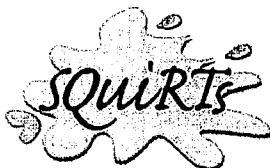
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ANALYTE All concentrations in parts per billion dry weight unless specified otherwise	CAS Number	FRESHWATER SEDIMENT							DUTCH Sediment ⁵		MARINE SEDIMENT							Eco Tox EqD ⁹ @1%TOC	
		ARCS <i>Hyalella</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸	
Dichloroaniline, 2,4-	554007								< 5	< 50,000 S									
Dichloroaniline, 3,4-	95761								< 5	< 50,000 S									
Dichloroaniline, 3,4-	95761								< 5	< 50,000 S									
Dichlorobenzene, 1,2-	95501								< 30	17,000 LB								13 N	340
Dichlorobenzene, 1,3-	541731								< 30	24,000 LB									1700
Dichlorobenzene, 1,4-	106467								< 30	18,000 LB								110 IM	350
Dichlorobenzenes	25321226								< 30	19,000 LB									
Dichloroethane, 1,1-	75343								20	15,000									
Dichloroethane, 1,2-	107062								20	4,000									
Dichloroethene, 1,1- (vinylidene chloride)	75354								100	300									
Dichloroethene, 1,2- (cis or trans)	540590								200	1,000									0.2083
Dichlorophenol, 2,4-	120832								< 10	8,400 LB									
Dichlorophenol, 2,6-	87650								< 10	57,000 LB									
Dichlorophenol, 3,4-	95772								< 10	57,000 LB									
Dichlorophenol, 3,5-	591355								< 10	5,400 LB									
Dichlorophenols (sum)	na								< 10	22,000 LB									
Dichloropropane, 1,2- (propylene dichloride)	78875								< 2	< 2,000									
Diieldrin ‡	60571	2.85	1.9	2	6.67	61.8	910	300 I	0.5	1,900 LB	0.83	0.72	0.02	2.9	4.3	8	1.9 E	6 BL	630
Diethyl phthalate	84662								530 L	53,000 L									
Diethylene-glycol	111466									270,000 S									
Dihydroxybenzenes, sum	na								62 LB	8,000 LB									
Di-iso-butyl phthalate	84695								92 LB	17,000 LB									
Dimethyl phthalate	131113								1,000 LB	84,000 LB									6 B
Dimethylnaphthalene, 2,6-	581420										25			133					18 N
Dimethylphenol, 2,4-	105679																	58 BL	11,000
Di-n-butyl phthalate	84742							110 H	7,000 LB	36,000 LB								61 BL	
Di-n-octyl phthalate	117840								< 100	< 60,000									
Dodecylbenzene	25155300									1,000,000 S									
Endosulfan (a or b)	115297								0.01	4,000									2.9 α 14 β

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Screening Quick Reference Tables for Organics – Sediment

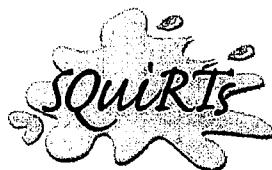
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ANALYTE	CAS Number	FRESHWATER SEDIMENT							DUTCH Sediment ⁵		MARINE SEDIMENT							Eco Tox EqP ⁶ @1%TOC	
		ARCS <i>Hyalella</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸	
All concentrations in parts per billion dry weight unless specified otherwise																			
Endosulfan II	33213659																		
Endrin	72208		2.67	2.22	3	62.4	207	1,300	500 I	0.04	95 L								
Ethyl acetate	141786										75,000 S								
Ethyl acetate	141786										75,000 S								
Ethyl benzene	100414										30	50,000							
Ethylene glycol	107211										100,000 S								
Fluoranthene	206440	31.46	111	423	750	2,355	2,230	10,200	1,500 M	1,000 LB	260,000	119	113	600	1,034	1,494	5,100	1,300 E	
Fluorene	86737	10	21.2 c	77.4	190	144 c	536	1,600	300 M		100 S	19	21.2	19	114	144	540	120 E	540
Formaldehyde	50000										2,000 S								
Guthion (Azinphos-methyl)	865000										4,000								
Heptachlor	76448										4,000							0.3 B	
Heptachloroperoxide	1024573	0.6	2.47	5	2.74	16		50	30 I	0.002	2,000 LB	0.6 c						6 B	
Hexachlorobenzene	118741				20			240	100 I	1.4 LB								1.3 E	
Hexachlorobutadiene (HCBD)	87683							120	100 I										
Hexachlorocyclohexane (BHC)	608731			3														73 BL	
Hexachloroethane	67721																	1,000	
Hydroquinone (p-dihydroxybenzene)	123319																		
Indeno[1,2,3-cd]pyrene	193395	17.32			200			3,200	330 M	31 LB	43,000 LB							600 M	
Linar alkylbenzene sulfonates (LAS)	na										1,900 LB	68	<12,800 €					0.67	
Malathion	121755										22,000 L								
Maneb	12427382										30,000 S								
Methanol	67561																	19	
Methoxychlor	72435										35,000 S	21	20.2	70	128	201	670	64 E	
Methyl ethyl ketone (MEK; 2-Butanone)	78933																		
Methyl naphthalene, 2-	91576																		
Methylene chloride (Dichloromethane, DCM)	75092																		
Methyl naphthalene, 1-	90120																		
Methylphenanthrene, 1-	832699																		
Methyl-tert-butyl ether (MTBE)	1634044																		
Mirex	2385855			7				1,300	800 I		100,000 S								

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Screening Quick Reference Tables for Organics – Sediment

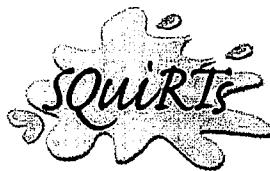
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		ARCS <i>Hyalella</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸		
All concentrations in parts per billion dry weight unless specified otherwise																				
Monochloroaniline (3 isomers)	na									5	50,000									
Monochlorobenzenes	108907									< 30	15,000 LB								820	
Monochloronaphthalenes	na									120 LB	10,000									
Monochlorophenols (sum)	na									< 10	5,400 L									
Naphthalene	91203	14.65	34.6 c	176		391 c	561		600 I	120 LB	17,000 LB	30	34.6	160	217	391	2,100	230 E	480	
Nitrobenzene	98953																	21 N		
Nitrosodiphenylamine, N-	86306																	28 I		
Nonylphenol	25154523		1,400 c										1,000 c							
PAHs, Low MW	na	76.42								5,300 M	< 1,000	< 40,000	312	552						
PAHs, High MW	na	193								6,500 M	< 1,000	< 40,000	655	1,700						
PAHs, Total	na	264.1		1,610	4,000		22,800*	100,000*		12,000 M	1,000	40,000	1,684	4,022						
PCB 105	32598144										1.5 LB	< 1,000								
PCB 126	57465288										0.0025 LB	920 LB								
PCB 77	32598131										0.42 LB	< 1,00								
PCB-Aroclor 1254	na		60 c		60	340 c		340		0.3 LB	1,000	35	63.3 c							
PCBs (sum)	1336363	31.62	34.1	59.8	70	277	676	5,300	26 M			21.6	22.7	368	189	180	130 M			
Pentachloroaniline	527208																		690	
Pentachlorobenzene	608935										15 LB	16,000 LB								
Pentachlorophenol [PCP: at pH 7.8#]	87865										< 10	8,000 LB							17 B	
Perylene	198550												74							
Phenanthrene	85018	18.73	41.9	204	560	515	1,170	9,500	800 I	3,300 LB	31,00 LB	68	86.7	240	455	544	1500	660 E		
Phenol	108952									48 † H	50	14,000 LB							130 E	
Phthalates (sum)	na										100	60,000								
Propanol, 2- (Isopropanol)	67630											220,000 S								
Pyrene	129000	44.27	53	195	490	875	1,520	8,500	1,000 i		100	500	125	153	665	932	1,398	2,600	2,400 E	
Pyridine	110861										34 LB	4,600 LB								
Resorcinol (m-dihydroxybenzene)	108463										200 LB	86,000 LB								
Styrene (Vinyl benzene)	100425											< 30,000 S								
Tetrachloroaniline, 2,3,5,6-	3481207											160 L	16,000 L							
Tetrachlorobenzene, 1,2,3,4-	634662											6.5 L	650 L							
Tetrachlorobenzene, 1,2,3,5-	634902																			

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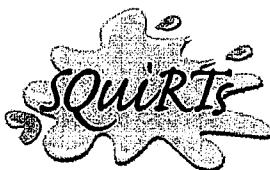
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		ARCS <i>Hyalella</i> TEL ¹	TEL ²	TEC ²	LEL ³	PEL ²	PEC ²	SEL ³	UET ⁴ @1%TOC	Target	Intervention	T ₂₀ ⁶	TEL ⁷	ERL ⁷	T ₅₀ ⁶	PEL ⁷	ERM ⁷	AET ⁸
Tetrachlorobenzene, 1,2,4,5-	95943									10 L	1,000 L							
Tetrachlorobenzenes	na									22 L	2,200 L							
Tetrachloroethylene (Tetrachloroethene; PCE; PER)	127184									2	4,000							57 I
Tetrachlorophenol, 2,3,4,5-	4901513									< 10	< 10,000							530
Tetrachlorophenol, 2,3,4,6-	58902									< 10	< 10,000							
Tetrachlorophenols (sum)	25167833									< 10	< 10,000							
Tetrahydrofuran	109999									100	2,000							
Tetrahydrothiophene	110010									100	8,800 LB							
Toluene	108883									10	47,000 L							670
Toxaphene	8001352	0.1 c								< 10	< 2,500							28
Tributyltinoxide	56359										10,000 S							
Trichloroaniline (multiple isomers)	na										< 10,000 S							
Trichloroaniline, 2,4,5-	636306									< 11 L	5,000 L							
Trichlorobenzene, 1,2,3-	87616									11 LB	5,100 LB							
Trichlorobenzene, 1,2,4-	120821									38 L	11,000 L							
Trichlorobenzenes	12002481									70	15,000							
Trichloroethane, 1,1,1-	71556									400	10,000							170
Trichloroethane, 1,1,2-	79005									7.8 L	2,500 L							
Trichloroethene (TCE)	na									< 10	4,500 L							
Trichlorophenol, 2,3,5-	na									< 10	22,000 LB							
Trichlorophenol, 2,4,5-	95954									< 10	110,000 LB							3 I
Trichlorophenol, 2,4,6-	88062									< 10	22,000 L							6 I
Trichlorophenols (sum)	na									10	100							
Vinyl chloride	75014									130 LB	17,000 LB							
Xylene	1330207									110 LB	18,000 LB							4 BL
Xylene, m-	108383									89 LB	9,300 LB							25
Xylene, o-	95476																	

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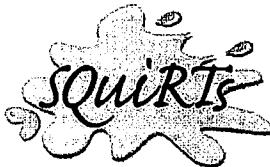
Sources

- 1 – Assessment & Remediation of Contaminated Sediments (ARCS) Program, Sept 1996. EPA 905-R96-008.
- 2 – MacDonald et al, 2000. Arch ET&C 39(1):20-
C – Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Summary Tables Update 2002, www.ccme.ca/publications/cegg_rcqe.html
- 3 – Persuad 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Thompson et al., 2005. Environ Monitor & Assessment 110:71-
- 4 – Buchman 1999. NOAA HAZMAT Report 99-1.
- 5 – Entry is lower of current VROM Environmental Quality standards or the updated RIVM Environmental Risk Limits. Risk limits are typically divided by 100 to derive the Target value; this computation has not been done here.
Dutch Target/Intervention: E.M.J. Verbruggen, R. Posthumus and A.P. van Wezel, 2001. Ecotoxicological Serious Risk Concentrations for soil, sediment, and (ground)water: updated proposal for first series of compounds.
Nat. Inst. Public Health and the Env., and subsequent updates as published elsewhere.
Min. Housing, Spatial Plan. And the Env., 2000. Annexes Circular on target values and intervention values for soil remediations.
- 6 – Field et al., 2002. ET&C 21:1993-
- 7 – MacDonald et al., 1996. Ecotox. 5(4):253-
C – Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, Summary Tables Update 2002, www.ccme.ca/publications/cegg_rcqe.html
€ - DelValls et al., 1999. Ecotox. & Env Rest 2(1):34-
- 8 – Wash Dept Ecol Publ 95-308, 1995 and 97-323a, 1997
Gries & Waldrow Puget Sound Dredged Disposal Analysis Rept 1996. <http://www.ecy.wa.gov/biblio/wac173204.html>
plus unpublished information.
- 9 – EcoUpdate EcoTox Thresholds, <http://www.epa.gov/oswer/riskassessment/>

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Screening Quick Reference Tables for Organic in Water and Soil

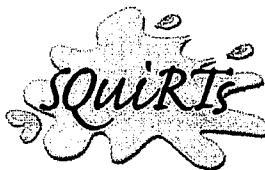
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ANALYTE All concentrations in parts per billion unless specified otherwise	CAS Number	GROUND WATER			SURFACE WATERS				SOIL			
		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
2,3,7,8-TCDD (dioxin TEQs)	1746016		0.001 ^{ng/L} S	0.00003	<0.01 *	<0.00001 *				0.000199		
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	93765			9 W		36 NZ				596		
2,4-Dichlorophenoxyacetic acid (2,4-D)	94757			70		4.0 CA				27.2		
Acenaphthene	83329				1,700 *	5.8 CA	970 *	40 Eco		682,000		
Acenaphthylene	208968					4,840 V	300 *C			682,000	20,000	
Acetone	67641				28,000 T	1,500 T				2,500		
Acetonitrile	75058					160 NZ				1,370		
Acetophenone	98862									300,000		
Acetylaminofluorene, 2-	53963									596		
Acridine	260946											
Acrolein	107028											
Acrylonitrile	107131	0.08	5 S		7,550 *	2,600 *				23.9		
Alcohol ethoxylated surfactants (AE)	na					140 NZ						
Alcohol ethoxylated sulfate (AES)	na					650 NZ						
Aldicarb	116063					1 CA						
Aldrin	309002	0.009 ^{ng/L}	< 0.1	9 C	1.5 (½)	0.017 V	0.65 (½)	0.15 CA			3.32 V	0.06 D
Aldrin+Dieldrin+Endrin	na		0.1	<0.03 W								5 D
Allyl chloride	107051									13.4		
Aminobiphenyl, 4-	92671									3.05		
Aminomethylphosphonic acid (AMPA)	1066519	0.797 L										
Amitrole	61825											
Aniline	62533											
Anthracene	120127	0.0007	5		13 T	0.73 T 0.012 CA	300 *C			1.48E6		
Aramite	140578									16,600		
Atrazine	1912249	29 ^{ng/L}	76 L	3		1.8 CA		10 BC				0.2 D
Benz[a]anthracene	56553	0.0001	0.5		0.49 T	0.027 T	300 *C			5,210		
Benzene	71432	0.2	30	5	2,300 T	46 Eco	5,100 *	110 CA		255		10 D
Benzidine	92875				70 T	3.9 T						
Benzo(ghi)perylene	191242	0.0003	0.05			7.64 V	300 *C			119,000		
Benzo[a]pyrene	50328	0.0005	0.05	0.2	0.24 T	0.014 T Eco	300 *C			1,520		

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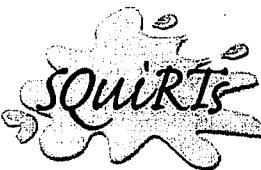
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A N A L Y T E <small>All concentrations in parts per billion unless specified otherwise</small>	C A S N u m b e r	G R O U N D W A T E R			S U R F A C E W A T E R S				S O I L				
		D u t c h ¹		M C L ²	F r e s h		M a r i n e		I n v e r t e b r a t e s ⁴	M a m m a l s ⁵	P l a n t s ⁶	O t h e r ⁷	
		T a r g e t	I n t e r v e n t i o n		A c u t e ³	C h r o n i c ³	A c u t e ³	C h r o n i c ³					
Benzo[b]fluoranthene	205992						9.07 V	300 *C		59,800			
Benzo[k]fluoranthene	207089	0.0004	0.05				740 T	42 T		148,000			
Benzoic acid	65850						150 T	8.6 T			65,800		
Benzyl alcohol	100516						39 T	2.2 T			99.4		
BHC, alpha (α -HCH)	319846	33 ng/L	<1				2.2 T					3 D	
BHC, beta (β -HCH)	319857	8 ng/L	<1				0.495 V					3.98 V	9 D
BHC, delta δ -HCH)	319868	< 0.05	<1				39 T	2.2 T			9,940		< 10 D
BHC, gamma (γ -HCH; Lindane)	58899	9 ng/L	<1	0.2	0.95	0.08	0.08 ($\frac{1}{2}$)					5 V	0.05 D
BHC (sum)	na	0.05	1		< 0.95	< 0.08	< 0.08						10 D
Biphenyl	92524						14 T Eco					60,000	
Bis(2-chloroethoxy) methane	111911				11,000 *C		12,000 *C	6,400 *C			302		
Bis(2-chloroethyl) ether	111444						1,900 V	32 Eco			23,700		
Bis(2-ethylhexyl)phthalate (DEHP)	117817	1.9 mg/L L	< 5	6	400 p	16 CA 0.3 V	400 p	360 p			925		< 100 D
Bis-2-chloro-1-methylethylether	108601										19,900		
Bromocil	314409						5 CA						
Bromodichloromethane (Dichlorobromomethane)	75274			60 W	11,000 *C		12,000 *C	6,400 *C			540		
Bromoform (Tribromomethane)	75252		630		2,300 T	320 T Eco					15,900		
Bromoxynil	1689845			5 C		5 CA							
Butanol	35296721		5,600 S 6,300 S										
Butyl acetate, 1- or 2-	na												
Butyl benzyl phthalate	85687	2.9 mg/L L	< 5		940 *C	19 T Eco 1.3 CA	2,944 *C	3.4 *C			239		< 100 D
Captan	133062												
Carbaryl	63252	2 mg/L	41 L	90 C		0.2 CA		0.32 CA					
Carbofuran	1563662	9 mg/L	6.5 L	40		1.8 CA		0.06 NZ					
Carbon disulfide	75150				17 T	0.92 T					94.1		
Carbon tetrachloride (Tetrachloromethane; Tetra)	56235	0.01	10	5	180 T	9.8 T	50,000 *	5,000 \times 0.1			2,980		1,000,000 M 400 D 50 D
Catechol (o-Dihydroxybenzene)	120809	0.2	630 L										

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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Chlordane	57749	0.02 ^{mg/L}	0.2	2	1.2 ($\frac{1}{2}$)	0.00215 ($\frac{1}{2}$)	0.045 ($\frac{1}{2}$)	0.002 ($\frac{1}{2}$)			224 V	0.03 D
Chlordane (alpha)	5103719	< 0.02 ^{mg/L}	< 0.2								< 224 V	< 0.03 D
Chlordane (gamma)	5103742	< 0.02 ^{mg/L}	< 0.2								< 224 V	< 0.03 D
Chlorfenvinphos	470906					0.1 EU		0.1 EU				
Chloroacetamide	79072								2,000			5 D
Chloroaniline	27134265		30									< 5 D
Chloroaniline, 3-	108429		< 30									< 5 D
Chloroaniline, 4-	106478		< 30		250 *C	50 *C	160 *C	129 *C		30,000	20,000	< 30 D
Chlorobenzenes (sum)	na	< 7	< 180	100		130 Eco <47 V				< 40,000	< 13,100	30 D
Chlorobenzilate	510156										5,050	20 D
Chloroform (trichloromethane)	67663	6	400	200 W	490 T	1.8 CA					1,190	
Chloro, 4- 2-methyl phenol	1570645		< 350 S								7,950	
Chloro, 4- 3-methyl phenol	59507		< 350 S								< 7,950	
Chloro, 4- methyl phenols	na		350 S									
Chloro, 4- 2-methylphenoxy acetic acid (MCPA)	94746	0.02	50	2 W		2.6 CA		4.2 CA				0.05 D
Chloronaphthalene, 1-	90131	3.7 ^{mg/L}	< 6									
Chloronaphthalene, 2-	91587	0.016 L	< 6		1,600 * C	0.396 V	7.5 * C				12.2	
Chlorophenol, 2-	95578	< 0.3	< 100		4,380 *	490 NZ 24 V					243	< 10 D
Chlorophenol, 3-	108430	< 0.3	< 100							10,000		< 10 D
Chlorophenol, 4-	106489	< 0.3	< 100			220 NZ					7,000	< 10 D
Chlorophenols (sum)	na	0.3	100			< 24 V				< 10,000	< 243	< 10 D
Chloroprene	126998										2.9	
Chlorothalonil	1897456			200 BC		0.18 CA		0.36 CA				
Chlorpyrifos	2921882			30 W	0.083	0.041		0.011				
Chrysene	218019	0.003	0.2				300 *C				4,730	
Cresol [m-] (3-Methyl phenol)	108394	< 0.2	< 200								3,490	< 50 D
Cresol [o-] (2-Methyl phenol)	95487	< 0.2	< 200		230 T	13 T					40,400	< 50 D
Cresol [p-] (4-Methyl phenol)	106445	< 0.2	< 200								163,000	< 50 D
Cresols, sum	1319773	0.2	200		< 230 T	< 13 T					< 3,490	50 D
Cyclohexanone	108941	0.5	15,000									100 D

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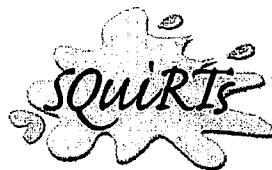
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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
DDD, 4,4- (p,p-DDD, TDE)	72548	<0.004 ng/L	< 0.01	< 1 W	0.19 T	0.011 T	3.6 *	0.36 x 0.1		758		< 10 D
DDE, 4,4- (p,p-DDE)	72559	<0.004 ng/L	< 0.01	< 1 W	1,050 *	105 x 0.1	14 *	1.4 x 0.1		596		< 10 D
DDT, 4,4- (p,p-DDT)	50293	<0.004 ng/L	< 0.01	< 1 W	0.55 (½)	0.0005 (½)	0.065 (½)	0.0005 (½)		3.5		< 10 D
DDT+DDE+DDD (sum)	na	0.004 ng/L	0.01	1 W	<0.55 (½)	<0.0005 (½)	<0.065 (½)	<0.0005 (½)		21 EPA		93 A 10 D
Decane	124185				880 T	49 T						
Deltamethrin	52918635					0.0004 CA						
Demeton	8065483					0.1						
Diallate	2303164									452		
Diazinon	333415				20 C	0.17	0.17	0.82				
Dibenz[ah]anthracene	53703						300 *C			18,400		
Dibenzo furan	132649				66 T	3.7 T						
Dibromo, 1,2- 3-chloropropane (DBCP)	96128				0.2					35.2		
Dibromochloromethane (Chlorodibromomethane)	124481				100 W	11,000 *C		12,000 *C		2,050		
Dibromoethane, 1,2-	106934				0.4 W			6,400 *C			1,230	
Dicamba	1918009				120 C		10 CA					
Dichloro, 1,4- 2-butene (cis)	1476115										1,000,000 M	
Dichloro, 1,4- 2-butene (trans)	110576										1,000,000 M	
Dichloroaniline, 2,4-	554007		< 100 S				7 NZ					< 5 D
Dichloroaniline, 3,4-	95761		< 100 S				3 NZ					< 5 D
Dichlorobenzene, 1,2-	95501	< 3	< 50	600	260 T	0.7 CA	< 1,970 *S	150 NZ	100,000	20,000		< 30 D
Dichlorobenzene, 1,3-	541731	< 3	< 50		630 T	71 T Eco 38 V	< 1,970 *S	42 CA			2,960	< 30 D
Dichlorobenzene, 1,4-	106467	< 3	< 50	75	180 T	15 T Eco 60 NZ 9.4 V	< 1,970 *S	129 *C	20,000		37,700	< 30 D
Dichlorobenzenes	25321226	3	50	< 75	< 180 T	< 0.7 CA	1,970 *S		< 20,000		546	< 30 D
Dichloroberizidine, 3,3-	91941					4.5 V					646	< 30 D
Dichlorodifluoromethane	75718										39,500	
Dichloroethane, 1,1-	75343	7	900		830 T	47 T Eco					20,100	20 D
Dichloroethane, 1,2-	107062	7	400	5	8,800 T	100 CA	113,000 *	11,300 x 0.1			21,200	20 D

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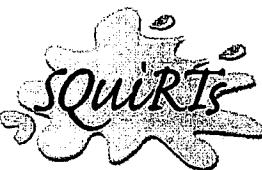
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		Dutch ¹ Target	Intervention	MCL ²	Fresh Acute ³	Chronic ³	Marine Acute ³	Chronic ³	Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
Dichloroethene, 1,1- (vinylidene chloride)	75354	0.01	10	7	450 T	25 T	224,000 *S			8,280		100 D
Dichloroethene, 1,2- (cis or trans)	540590	0.01	20	70 cis	1,100 T	590 T	224,000 *S					200 D
Dichloroethene, 1,2- (trans)	156605			100	11,600 *S	1,160 x 0.1	224,000 *S			784		
Dichlorophenol, 2,4-	120832	< 0.2	< 30	900 C	2,020 *	160 NZ 11 V				87,500		< 10 D
Dichlorophenol, 2,6-	87650	< 0.2	< 30			< 0.2 CA				1,170		< 10 D
Dichlorophenol, 3,4-	95772	< 0.2	< 30			< 0.2 CA			20,000		20,000	< 10 D
Dichlorophenol, 3,5-	591355	< 0.2	< 30			< 0.2 CA						< 10 D
Dichlorophenols (sum)	na	0.2	30	< 900 C	<2,020 *	0.2 CA			< 20,000	< 1,170	< 20,000	< 10 D
Dichloropropane, 1,2- (propylene dichloride)	78875	< 0.08	< 80	5	23,000 *S	5,700 *S	10,300 *S	3,040 *S	700,000	32,700		< 2 D
Dichloropropene, 1,3-	542756				20 W	0.99 T	0.055 T	790 *S				
Dichloropropene, 1,3- (cis)	10061015				< 20 W	< 0.99 T	< 0.055 T			398		
Dichloropropene, 1,3- (trans)	10061026				< 20 W	< 0.99 T	< 0.055 T			398		
Diclofop-methyl	51338273				9 C		6.1 CA					
Dicofol	115322						0.5 NZ	0.1 NZ				
Didecyl dimethyl ammonium chloride (DDAC)	7173515						1.5 CA					
Dieldrin ‡	60571	0.1 ‰/L	< 0.1		0.24	0.056	0.355 (½)	0.00095 (½)		2.38		22 A
Diethyl phthalate	84662	< 0.5	< 5		1,800 T	210 T 110 V	2,944 *C	3.4 *C		24,800	100,000	< 100 D
Diethylene-glycol	111466		13,000 S									
Dihydroxybenzenes, sum	na	0.24 L										
Di-iso-butyl phthalate	84695	< 0.5	< 5			6.2 CA 0.15 NZ				218		< 100 D
Dimethoate	60515				6 W							
Dimethyl aminoazobenzene [p-]	60117									40		
Dimethyl benz(a)anthracene, 7,12-	57976									16,300		
Dimethyl benzidine, 3,3-	119937									104		
Dimethyl naphthalene, 2,6-	581420									300		
Dimethyl phenethylamine [alpha,alpha]	122098										10 v	
Dimethyl phenol, 2,4-	105679				2,120 *	100 V			200,000	734,000		< 100 D
Dimethyl phthalate	131113	< 0.5	< 5		940 *C	3 *C	2,944 *C	3.4 *C				

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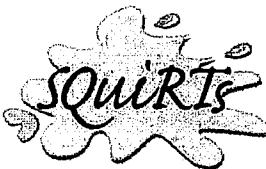
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		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Di-n-butyl phthalate	84742	< 0.5	< 5		190 T	19 CA 9.7 V	2,944 *C	3.4 *C		150	200,000	< 100 D
Dinitrobenzene, 1,3-	99650									655		
Dinitrophenol, 2,4-	51285				230 *C	45 NZ 19 V	4,850 *C			60.9		
Dinitrotoluene, 2,4-	1211142				330 *	65 NZ 44 V	590 * S	370 *S		1,280		
Dinitrotoluene, 2,6-	606202									32.8		
Di-n-octyl phthalate	117840	< 0.5	< 5	7	940 *C	3 *C 0.05 CA	2,944 *C	3.4 *C		709,000		< 100 D
Dinoseb	88857									21.8		
Dioxane, 1,4-	123911									2,050		
Dioxins (sum of PCDDs)	na		0.001 mg/L S							0.000199		
Diphenlyhydrazine 1,2-	122667				270 *	27 x 0.1						
Diphenylamine	122394									1,010		
Diquat	85007			20		1.4 NZ						
Disulfoton	298044									19.9		
Diuron	330541			150 C		0.1EU		0.1EU				
Dodecylbenzene	25155300		0.02 S									
Endosulfan (α or β : I or II)	115297	0.2 mg/L	5		0.11 (½)	0.028 (½)	0.017 (½)	0.00435 (½)		119		0.01 D
Endosulfan sulfate	1031078					2.22 V				35.8		
Endrin	72208	0.04 mg/L	< 0.1	2	0.086	0.036	0.0185 (½)	0.00115 (½)		10.1		0.04 D
Endrin aldehyde	7421934					0.15 V				10.5		
Esfenvalerate	66230044					0.001 NZ						
Ethanol	64175					1,400 NZ						
Ethyl acetate	141786		15,000 S									
Ethyl benzene	100414	4	150	700	130 T	7.3 T 14 V	430 *	25 CA		5,160		30 D
Ethyl methacrylate	97632									30,000		
Ethylene glycol	107211		5,500 S			192,000 CA						
Famphur	52857									49.7		
Fenitrothion	122145					0.2 NZ						
Fluoranthene	206440	0.003	1		3,980 *	0.04 CA	40 *	11 Eco		122,000		
Fluorene	86737				70 T	3.9 T Eco	300 *C		30,000	122,000		

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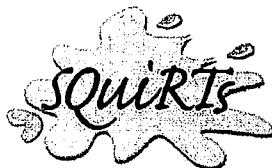
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		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Formaldehyde	50000		50 S	900 W								
Furan	110009			280 C		65 CA					600,000	
Glyphosate	1071836					0.01						
Guthion (azinphos-methyl)	865000	0.1 mg/L	2 S	20 C	0.26 (½)	0.0019 (½)	0.0265 (½)	0.0018 (½)	0.01			0.005 D
Heptachlor	76448	0.005 mg/L	0.3	0.4						5.98		0.7 D
Heptachlor epoxide	1024573	0.005 mg/L	3	0.2	0.26 (½)	0.0019 (½)	0.0265 (½)	0.0018 (½)		152		0.0002 D
Hexachlorobenzene	118741	2.1E-7 L	0.5	1	6 p	3.68 p 0.0003 V	160 *C	129 *C		199		1,000,000 M
Hexachlorobutadiene (HCBD)	87683			0.6 W	90 *	1.3 CA 0.053 V	32 *	3.2 x 0.1		39.8		
Hexachlorocyclohexane (BHC)	608731				100 *	10 x 0.1	0.34 *	0.034 x 0.1				
Hexachlorocyclopentadiene	77474			50	7 *	5.2 *	7 *	0.7 x 0.1		755	10,000	
Hexachloroethane	67721				210 T	12 T Eco 8 V	940 *	94 x 0.1		596		
Hexachlorophene	70304									199		
Hexane	110543				10 T	0.58 T						
Hexanone, 2- (methyl butyl ketone)	591786				1,800 T	99 T					12,600	
Hydroquinone (p-dihydroxybenzene)	123319	0.2	800									50 D
Indeno[1,2,3-cd]pyrene	193395	0.0004	0.05			4.31 V	300 *C			109,000		
Iodo, 3- 2-propynyl butyl carbamate (IPBC)	55406536					1.9 CA						
Isodrin	465736										3.32 V	
Isophorone	78591				117,000 *	1,170 x 0.1 920 V	12,900 *	1,290 x 0.1		139,000		
Isoproturon	34123596			9 W		0.1 EU		0.1 EU				
Isosafrole	120581									9,940		
Kepone	143500									32.7		
Linar alkylbenzene sulfonates (LAS)	na					280 NZ						
Linuron	335502					7.0 CA						
Malathion	121755			190 C		0.1		0.1				
Maneb	12427382	0.05 mg/L	0.1							57		2 D
Methacrylonitrile	126987											
Methanol	67561		24,000 S									

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Screening Quick Reference Tables for Organic in Water and Soil

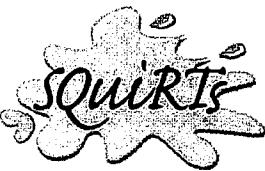
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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Naphthylamine, 1-	134327									9,340		
Naphthylamine, 2-	91598									3,030		
Nitroaniline [m-]	99092									3,160		
Nitroaniline [p-]	100016									21,900		
Nitroaniline, 2-	88744									74,100		
Nitrobenzene	98953			27,000 *	550 NZ 220 V	6,680 *	668 x 0.1	40,000	1,310			1,000,000 M
Nitro-o-toluidine, 5-	99558									8,730		
Nitrophenol, 2-	88755									1,600		
Nitrophenol, 4-	100027			1,200 T	300 T 60 V	4,850 *C		7,000	5,120			
Nitroquinoline, 4- 1-oxide	56575									122		
Nitrosodiethylamine, N-	55185				768 V					69.3		
Nitrosodimethylamine, N-	62759									0.0321		
Nitroso-di-n-butylamine, N-	924163									267		
Nitroso-di-n-propylamine, N-	621647									544		
Nitrosodiphenylamine, N-	86306			3,800 T	210 T	3,300,000*C		20,000	545			
Nitrosomethylethylamine, N-	10595956									1.66		
Nitrosomorpholine, N-	59892									70.6		
Nitrosopiperidine, N-	100754									6.65		
Nitrosopyrrolidine, N-	930552									12.6		
Nonylphenol	25154523			28	6.6	7	1.7					
o,o-diethyl o-2-pyrazinylphosphorothioate	297972				150 T	8.3 T				799,000		
Octanone, 2-	111137											
PAHs, High MW	na					300 *C		29,000 EPA	100,000 EPA		< 1,000 D	
PAHs, Low MW	na					300 *C		18,000 EPA	1,100 EPA		< 1,000 D	
PAHs, Total	na					300 *C					1,000 D	
Paraquat	4685147				0.5 NZ							
Parathion	56382			50 C	0.065	0.013			0.34 V			
PCBs (sum)	1336363	0.01	0.01	0.5	0.6 T 0.03 NZ	0.014	0.033 T	0.03		0.332	40,000	< 20 D
Pentachloroaniline	527208		1 S					100,000				

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Screening Quick Reference Tables for Organic in Water and Soil

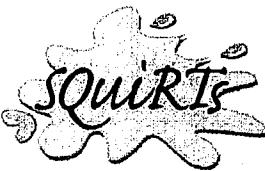
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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Pentachlorobenzene	608935	0.003	1		8.4 T	0.47 T 0.019 V	160 *C	129 *C	20,000	497		< 30 D
Pentachloroethane	76017				7,240 *	1,100 *	390 *	281 *		10,700		
Pentachloronitrobenzene	82688									7,090		
Pentachlorophenol [PCP: at pH 7.8]	87865	0.04	3	1.0	19 ph 2,000 T	15 Ph 110 T	13	7.9	6,000	119	3,000	2,100 A
Pentanol, 1-	71410											
Permethrin	52645531					0.004 CA		0.001 CA				
Phenacetin	62442									11,700		
Phenanthrene	85018	0.003	5		30 p	6.3 p Eco 3.6 V	7.7 p	4.6 p		45,700		
Phenol	108952	0.2	2,000		10,200 *	320 NZ 180 V	5,800 *	400 NZ	30,000	120,000	70,000	1,000,000 M 500 D
Phenylenediamine [p-]	106503									6,160		
Phorate	298022									0.496		
Phthalates (sum)	na	0.5	5	2 C								100 D
Picloram	1918021					29 CA						
Picoline, 2-	109068									9,900		
Polychlorinated dibenzofurans	51207319									0.0386		
Pronamide	23950585										13.6 v	
Propanol, 2- (Isopropanol)	67630		31,000 S		130 T	7.5 T						
Propionitrile	107120									49.8		
Propylene glycol	57556					500,000 CA 0.025 CA						
Pyrene	129000						300 *C			78,500		
Pyridine	110861	0.5	30			3.4 CA				1,030		100 D
Quinoline	91225											
Resorcinol (m-dihydroxybenzene)	108463	0.2	600									50 D
Safrole	94597									404		
Silvex (2,4,5-TP)	93721				50	10 CA 3.2 NZ					109 v	
Simazine	122349					72 CA 32 V		1 EU				
Styrene (Vinyl benzene)	100425	6	300	100						4,690	300,000	300 D

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Screening Quick Reference Tables for Organic in Water and Soil

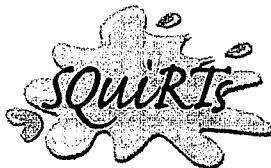
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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Tebuthiuron	34014181			490 BC		1.6 CA 2.2 NZ						
Temephos	3383968					0.05 NZ		0.05 NZ				
Tetrachloroaniline, 2,3,5,6-	3481207		< 10 S						20,000			
Tetrachlorobenzene, 1,2,3,4-	634662	< 0.01	< 2.5		250 *C	1.8 CA	160 *C	129 *C	10,000			< 30 D
Tetrachlorobenzene, 1,2,3,5-	634902	< 0.01	< 2.5		250 *C		160 *C	129 *C				< 30 D
Tetrachlorobenzene, 1,2,4,5-	95943	< 0.01	< 2.5		250 *C	50 *C 3 V	160 *C	129 *C		2,020		< 30 D
Tetrachlorobenzenes	na	0.01	2.5		250 *C	< 3 V	160 *C	129 *C	< 10,000	< 2,020		< 30 D
Tetrachloroethane, 1,1,1,2-	630206									225,000		
Tetrachloroethane, 1,1,2,2-	79345				2,100 T	111 CA	9,020 *	902 x 0.1		127		
Tetrachloroethylene (Tetrachloroethene; PCE; PER)	127184	0.01	40	5	830 T	98 T 45 V	10,200 *	450 *		9,920		2 D
Tetrachlorophenol, 2,3,4,5-	4901513	< 0.01	< 10			< 1 CA			20,000			< 10 D
Tetrachlorophenol, 2,3,4,6-	58902	< 0.01	< 10		100 C	20 NZ	440 *	44 x 0.1		199		< 10 D
Tetrachlorophenols (sum)	25167833	0.01	10			1 CA			< 20,000	< 199		< 10 D
Tetraethylthiopyrophosphate	3689245									596		
Tetrahydrofuran	109999	0.5	300									100 D
Tetrahydrothiophene	110010	0.5	5,000									100 D
Thiobencarb	28249776					2.8 NZ						
Thiram	137268					0.2 NZ		0.01 NZ				
Toluene	108883	7	1,000	1,000	120 T	9.8 T 2 CA	6,300 *	215 CA		5,450	200,000	10 D
Toluidine [o-]	95534									2,970		
Toxaphene	8001352				3	0.73	0.0002	0.21	0.0002		119	
Triallate	2303175					0.24 CA						
Tributyltinoxide	56359	<0.05E-16 mg/L	< 0.7		0.46	0.072	0.42	0.0074				< 1 D
Trichloroaniline (multiple isomers)	na		10 S									
Trichloroaniline, 2,4,5-	636306		< 10 S						20,000		20,000	
Trichlorobenzene, 1,2,3-	87616	< 0.10	< 10			8.0 CA			20,000			< 30 D
Trichlorobenzene, 1,2,4-	120821	< 0.10	< 10	70	700 T	24 CA	160 *C	5.4 CA	20,000	11,100		< 30 D
Trichlorobenzenes	12002481	0.01	10	< 70	< 700 T	< 8 CA	160 *C	<5.4 CA	< 20,000	< 11,100		< 30 D

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Screening Quick Reference Tables for Organic in Water and Soil

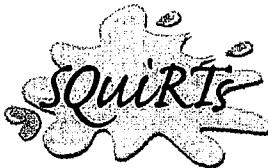
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		Dutch ¹		MCL ²	Fresh		Marine		Invertebrates ⁴	Mammals ⁵	Plants ⁶	Other ⁷
		Target	Intervention		Acute ³	Chronic ³	Acute ³	Chronic ³				
Trichloroethane, 1,1,1-	71556	0.01	300	200	200 T	11 T	31,200 *	3,120 x 0.1		29,800		70 D
Trichloroethane, 1,1,2-	79005	0.01	130	5	5,200 T	1,200 T 500 V		1,900 NZ		28,600		400 D
Trichloroethene (TCE)		24	500	5		21 CA	2,000 *	200 x 0.1		12,400		100 D
Trichloroethene, 1,1,1-	71556	< 24	< 500	< 5	< 440 T	< 21 CA						< 100 D
Trichloroethene, 1,1,2-	79016	< 24	< 500	< 5	< 440 T	< 21 CA						< 100 D
Trichlorofluoromethane	75694				11,000 *C		12,000 *C	6,400 *C		16,400		
Trichlorophenol, 2,3,5-	95954	< 0.03	< 10			< 18 CA						< 10 D
Trichlorophenol, 2,4,5-	95954	< 0.03	< 10		100 p	63 p	240 p	11 p	9,000	14,100	4,000	< 10 D
Trichlorophenol, 2,4,6-	88062	< 0.03	< 10	5 C		20 NZ 4.9 V			10,000	9,940		< 10 D
Triclorophenols, (sum)	na	0.03	10			18 CA			< 9,000	< 9,940	< 4,000	< 10 D
Trichloropropene, 1,2,3-	96184									3,360		
Triethylphosphorothioate [O,O,O-]	126681									818		
Trifluralin	1582098			20 W		0.2 CA		0.1EU				
Trinitrobenzene, 1,3,5-	99354									376		
Trinitrotoluene, 2,4,6-	118967						140 NZ					
Vinyl acetate	108054				280 T		16 T			12,700		
Vinyl chloride	75014	0.01	5	2		930 V				646		10 D
Xylene, m-	108383	< 0.2	< 70		32 T	1.8 T Eco						< 100
Xylene, o-	95476	< 0.2	< 70			350 NZ						< 100
Xylene, p-		< 0.2	< 70									< 100
Xylenes	1330207	0.2	70	10,000	230 T	13 T					10,000 V	100 D

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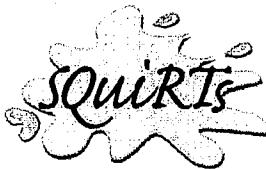


Screening Quick Reference Tables for Organic in Water and Soil

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Sources

- 1 – Entry is lower of current VROM Environmental Quality standards or the updated RIVM Environmental Risk Limits. Risk limits are typically divided by 100 to derive the Target value; this computation has been done here.
Dutch Target/Intervention: E.M.J. Verbruggen, R. Posthumus and A.P. van Wezel, 2001. Ecotoxicological Serious Risk Concentrations for soil, sediment, and (ground)water: updated proposal for first series of compounds. Nat. Inst. Public Health and the Env., and subsequent updates as published elsewhere.
Min. Housing, Spatial Plan. And the Env., 2000. Annexes Circular on target values and intervention values for soil remediations.
- 2 – Primary entry is the US EPA MCL value, followed by the lower of appropriate WHO, Canadian, or British Columbia guidelines.
Maximum Contaminant Levels (MCLs): <http://www.epa.gov/safewater/index.html>
W – World Health Organization's (WHO) Drinking water guidelines: http://www.who.int/water_sanitation_health/dwq/en/
C – Canadian Environmental Quality Guidelines for Community Water, Summary Table Update 2002: <http://www.ccme.ca>
BC – British Columbia Water Quality Guidelines (either working or recommended): <http://www.env.gov.bc.ca/wat/wq/>
- 3 – Primary entry is the US Ambient Water Quality Criteria, followed by the lowest of Tier II SAVs or available standards or guidelines.
Lowest Observable Effect Levels (LOELs) previously published by EPA are also included since these essentially were the basis for many state standards.
EPA Ambient water Quality Criteria (AWQC): <http://www.epa.gov/waterscience/criteria/aqlife.html>
T – Tier II Secondary Acute Value: <http://www.esd.ornl.gov/programs/ecorisk/tools.html>
Eco – EPA EcoUpdate, Ecotox Thresholds, EPA 540/F-95/038
CA – Canadian water Quality Guidelines: <http://www.ec.gc.ca/CEQG-RCQE/English/Cegg/Water/default.cfm>
BC – British Columbia Water Quality Guidelines (either working or recommended): <http://www.env.gov.bc.ca/wat/wq/>
EU – European Union (EU) Environmental Quality Standards: COM(2006) 397 and 398 final.
V – US EPA Region V Ecological Screening Levels: <http://www.epa.gov/reg5rcra/ca/edql.htm>
- 4 – Toxicological Benchmarks for Effects on Earthworms: <http://www.esd.ornl.gov/programs/ecorisk/tools.html>
EPA – Eco-SSL for Invertebrates: <http://www.epa.gov/ecotox/ecossi/>
Region V Ecological Screening Level for Invertebrates: <http://www.epa.gov/reg5rcra/ca/>
- 5 – Entry is lower of either:
Region V Ecological Screening Level for shrew or vole: <http://www.epa.gov/reg5rcra/ca/>
EPA – Eco-SSL for Mammals: <http://www.epa.gov/ecotox/ecossi/>
- 6 – Toxicological Benchmarks for Effects on Terrestrial Plants: <http://www.esd.ornl.gov/programs/ecorisk/tools.html>
V – EPA Region V Ecological Screening Level for Plants: <http://www.epa.gov/reg5rcra/ca/>
- 7 – Entry is lower of either:
M – Toxicological Benchmarks for Effects on Microbes: <http://www.esd.ornl.gov/programs/ecorisk/tools.html>
A – Eco-SSL for Avian Receptors: <http://www.epa.gov/ecotox/ecossi/>
D – Entry is lower of current VROM Environmental Quality standards or the updated RIVM Environmental Risk Limits. See #1 above for sources.



Screening Quick Reference Table for PCB Composition

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Degree of Chlorination	A1221 Wt %	A1232 Wt %	A1016 Wt %	A1242 Wt %	A1248 Wt %	A1254 Wt %	A1260 Wt %	A1262 Wt %
Biphenyl	11.7 ^a	6.2 ^a						
$\Sigma 1\text{ Cl}$	65.5	31.3	Tr (#1, 3)	Tr (#1, 3)				
$\Sigma 2\text{ Cl}$	30.0	26.1	15.2	11.5	Tr (#7, 8)			
$\Sigma 3\text{ Cl}$	3.5	21.7	58.2	51.0	21.8	2.1		
$\Sigma 4\text{ Cl}$	Tr	15.0	26.5	29.0	60.2	14.3	Tr (#52, 70, 74)	Tr (#52, 70, 74)
$\Sigma 5\text{ Cl}$	Tr (#95)	5.8	Tr (#91, 95, 102)	8.5	17.1	53.2	8.2	3.5
$\Sigma 6\text{ Cl}$				Tr (#136, 138)	0.8	26.6	47.2	31.6
$\Sigma 7\text{ Cl}$					Tr	3.8	37.6	45.8
$\Sigma 8\text{ Cl}$						Tr (#202)	6.3	17.7
$\Sigma 9\text{ Cl}$							0.7	1.3
Total	99.1%	99.94%	99.95%	100%	99.93%	99.95%	100.01%	99.98%
Prominent congeners ^b	1 3 8 4 15 6	1 8 3 4 15 28	18 28 8 31 33 16	18 28 31 8 33 16	66 70 64 28 52 60	118 110 101 95 138 153	180 138 149 187 174 170	180 153 187 149 174 203
Unique congener	#11 Tr					#137	#189 Tr	
Peak Range ^c	1-48	1-74	2-50	2-82	8-106	8-107	31.1-117	31.1-117
Ratio #118:203 ^d	Neither	No #203	Neither	No #203	73	370 - 1230	0.3 - 0.5	0.1
Ratio #31:118 ^e	No #118	4.3	No #118	8.5 - 9.2	2.1	0.01 - 0.04	0.1	No #31
Wt % of #153 ^f				0.1 - 0.14	Tr - 0.52	4.7-6.1	11.0 - 12.2	
Additional Information	~ 1:1 mix of 1221-1242		Distillation of 1242					

Notes

Commercial PCBs were manufactured by chlorination of biphenyl to produce complex mixtures (Aroclors in the USA and Great Britain, Clophens in Germany, or Kanechlor in Japan), each containing 60 to 90 different molecular species (*congeners*) and a specified weight percent of chlorine (for example, 54% in Aroclor 1254). There are 209 distinct congener structures possible, of which about 140 to 150 have been detected at significant levels in commercial PCBs.

Congener distributions in environmental samples roughly resemble those of the parent commercial mixtures, but are often modified due to evaporation, water extraction, microbial oxidation or dechlorination, photochemical dechlorination or differential biological uptake and metabolism. Compositional modification from original Aroclor patterns increases in biotic samples with trophic level. Still, it is often useful or necessary to attempt distinguishing the parent mixture released. The following information is presented to provide assistance with initial, preliminary evaluation of Aroclor. *Aroclor assignment should be conducted only by qualified chemists.*

Total PCBs can be characterized by two primary methods – the sum of congeners, or, the sum of estimates of individual Aroclor concentrations. In lower trophic level samples, these two methods provide approximately equal estimates of total PCBs. At higher trophic levels, analyses of samples tend to overestimate total PCBs by as much as 2-fold using the sum of Aroclor method, due to an overestimation of Aroclor 1254.

Tr - Individual congeners are at trace levels - 0.05 to 0.5% each - and are not included in totals.

- Refers to IUPAC congener number. IUPAC #'s 107, 108, 109, 199, 200, 201 correspond to BZ#'s 108, 109, 107, 201, 199, and 200, respectively.

a - Biphenyl figures are not reflected in congener weight percentages.

b - The six most prominent peaks listed by IUPAC congener number.

c - In the 118 peak numbering system, peak 1 is biphenyl.

d - This ratio is often used as an indicator for Aroclor 1260.

e - This ratio is often used as an indicator for Aroclor 1248.

f - Congener 153 is persistent in biota and abundantly present in higher chlorinated Aroclors and so provides a degree of modification estimate for biotic samples (increasing modification with decreasing PD values):

$$PD_{153} = \left[\frac{\#153_{theory} - \#153_{sample}}{\#153_{sample}} \right] * 100$$



Screening Quick Reference Table for Toxic Equivalency Factors

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Compound	2005 Mammals / human TEF	1998 Fish TEF	1998 Avian TEF
CHLORINATED DIBENZO-P-DIOXINS			
2,3,7,8-TCDD	1	1	1
1,2,3,7,8-PeCDD	1	1	1
1,2,3,4,7,8-HxCDD	0.1	0.5	0.05
1,2,3,6,7,8-HxCDD	0.1	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	0.01	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.001	<0.001
OCDD	0.0003	<0.0001	< 0.0001
CHLORINATED DIBENZOFURANS			
2,3,7,8-TCDF	0.1	0.05	1
1,2,3,7,8-PeCDF	0.03	0.05	0.1
2,3,4,7,8-PeCDF	0.3	0.5	1
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01
OCDF	0.0003	<0.0001	0.0001
NON-ORTHO-SUBSTITUTED PCBs			
3,3#,4,4#-tetraCB (PCB 77)	0.0001	0.0001	0.05
3,4,4#,5-tetraCB (PCB 81)	0.0003	0.0005	0.1
3,3#,4,4#,5-pentaCB (PCB 126)	0.1	0.005	0.1
3,3#,4,4#,5,5#-hexaCB (PCB 169)	0.03	0.00005	0.001
MONO-ORTHO-SUBSTITUTED PCBs			
2,3,3#, 4,4#-pentacB (PCB 105)	0.00003	<0.000005	0.0001
2,3,4,4#,5-pentaCB (PCB 114)	0.00003	<0.000005	0.0001
2,3#,4,4#,5-pentaCB (PCB 118)	0.00003	<0.000005	0.00001
2#,3,4,4#,5-pentaCB (PCB 123)	0.00003	<0.000005	0.00001
2,3,3#, 4,4#,5-hexaCB (PCB 156)	0.00003	<0.000005	0.0001
2,3,3#,4,4#,5#-hexaCB (PCB 157)	0.00003	<0.000005	0.0001
2,3#,4,4#,5,5#-hexaCB (PCB 167)	0.00003	<0.000005	0.00001
2,3,3#,4,4#,5,5#-heptaCB (PCB 189)	0.00003	<0.000005	0.00001

It has been well established that 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), and other chlorinated dioxins, furans, and even PCBs with a similar planar chemical structures are capable of inducing similar toxicity, such as carcinogenicity. Since these compounds generally are observed in mixtures, it is desirable to be able to express the cumulative, overall toxicity of the mixture. However, since each of these congeners does not exhibit the same degree, or potency, of toxicity, some manipulations of raw concentrations are required to express total toxicity.

A number of systems have been developed to express the total, overall toxicity from mixtures of these chemicals. Most commonly, the potency of each congener is weighted relative to a standard, generally the most potent congener. For dioxins and furans, 2,3,7,8-TCDD is the common standard which is given a reference value of one. The weighting, or potency factor, is called a Toxic Equivalency Factor (TEF). When cumulative results are reported, the absolute concentration of each congener is multiplied by its corresponding TEF to derive a TCDD-equivalency. These values are then summed together to give a total Toxic Equivalency Quotient, or TEQ.

The TEQ scheme refers **only** to adverse effects (e.g., cancer) following interactions with certain cellular enzyme systems (the Ah receptors). Other toxic effects of dioxins and dioxin-like compounds are not quantified by this method. Because they involve potency to specific enzyme systems, TEF values vary for different animal species.

There are two main schemes:

The two most common systems for determining TEQs are:

- 1) **I-TEF and I-TEQ:** The older International Toxic Equivalent (I-TEQ) scheme by the North Atlantic Treaty Organization (NATO) initially set up in 1989 and later extended and updated.
- 2) **WHO-TEF and WHO-TEQ** (also referred to as TEF or TEQ): More recently, the World Health Organization ([WHO](#)) suggested modified Toxic Equivalency Factor (TEF) values for human risk assessment.

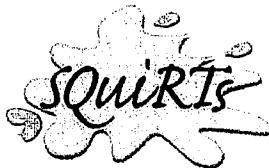
I-TEQs are most common in North America, while Asia and Europe tend to use WHO-TEQs. On average, the result of TEQ-calculations is about 10% higher when I-TEFs are used compared to when WHO-TEFs are used.

Potency in fish reflects mainly rainbow trout: potency for birds is mainly derived from chickens.

Sources

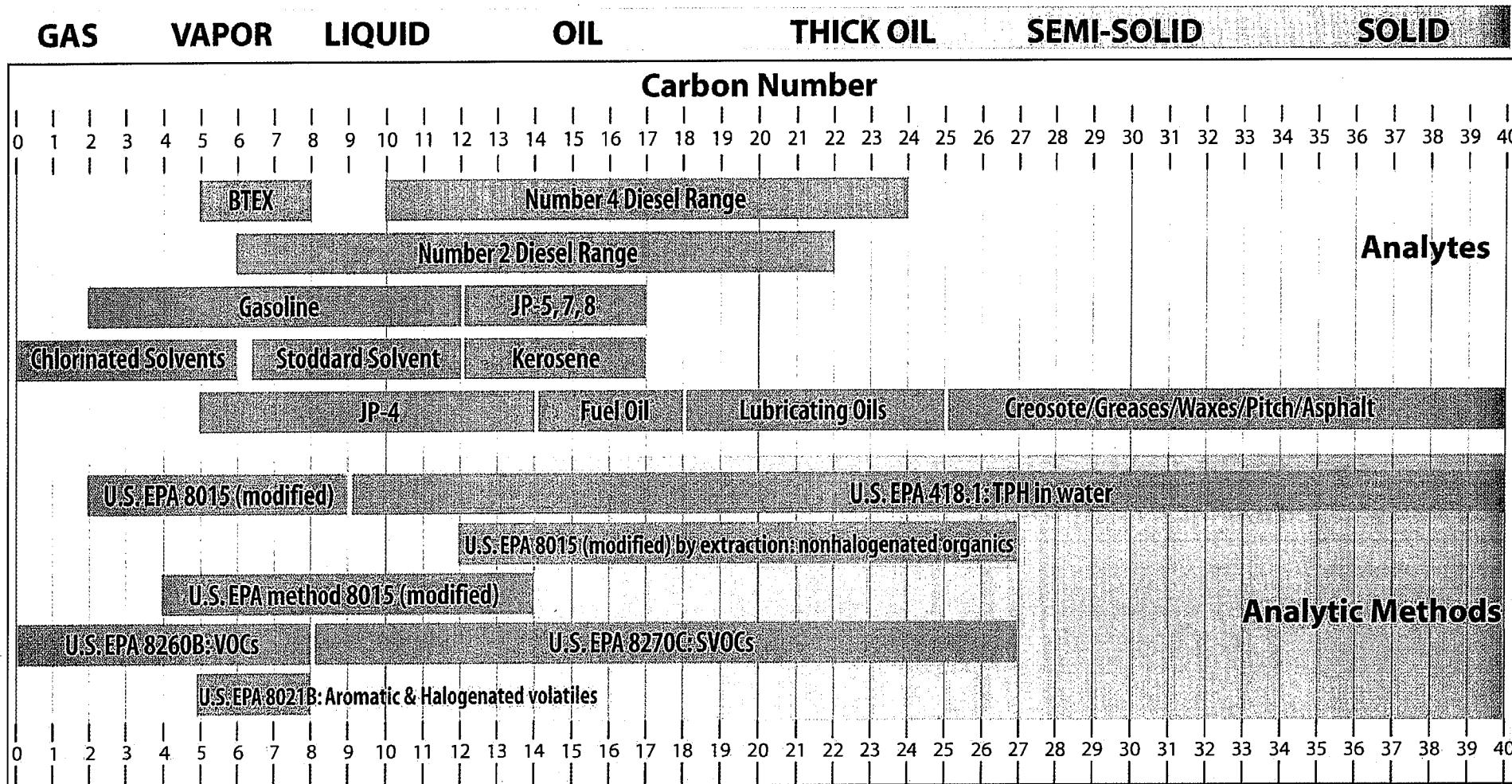
Van den Berg, M., and others. 1998. "Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, and PCDFs for Humans and Wildlife." *Environmental Health Perspectives*. Volume 106. Pages 775 - 792.

Van den Berg, M., and others. 2006. "The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds." *Toxicological Sciences* 93(2):223-241.



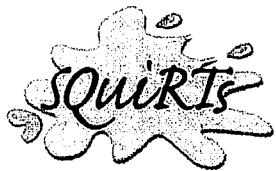
Screening Quick Reference Tables for Composition by Carbon Range

These tables were developed for screening purposes only; they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.



Carbon ranges are approximate: actual carbon ranges for a specific product are dependent upon the distillation process of the exact source.

Analytic Methods generally refer to EPA SW-846 methods (www.epa.gov/SW-846/index.htm)



Screening Quick Reference Tables for Sample Collection and Storage

These tables were developed for screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

MATERIAL	CONTAINER	PRESERVATION	MAXIMUM HOLDING TIME	SAMPLE SIZE
INORGANICS				
Chromium ⁺⁶ (Cr ⁺⁶)	P,G	Cool, 4°C	24 hours	400 mL/200 g
Mercury (Hg)	P,G	HNO ₃ , to pH <2	28 days	400 mL/200 g
Metals, except Cr ⁺⁶ and Hg	P,G	HNO ₃ , to pH <2	6 months	600 mL/200 g
Cyanide by method no. 9010	P,G	Cool 4°C, pH >12 See method 9010	14 days	1,000 mL
Alpha, Beta, and Radium Radiation	P,G	HNO ₃ to pH <2	6 months	1,000 mL
ORGANICS				
Benzidines	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1,000 mL
Chlorinated Hydrocarbons	G, TLC	Cool, 4°C ³	7 days until extraction, 40 days after extraction	1,000 mL
Dioxins and Furans	G, TLC	Cool, 4°C ³	30 days until extraction, 45 days after extraction	1,000 mL
Haloethers	G, TLC	Cool, 4°C ³	7 days until extraction, 40 days after extraction	1,000 mL
Nitrites	G, TLC	Cool, 4°C ³	14 days	
Nitrosamines	G, TLC	Cool, 4°C ³	7 days until extraction, 40 days after extraction	1,000 mL
Nitroaromatics and Cyclic Ketones	G, TLC	Cool, 4°C ³	7 days until extraction, 40 days after extraction	1,000 mL
OIL And GREASE	G	Cool, 4°C ²	28 days	1,000 mL
TOTAL Organic Carbon, By Method No. 9060	P,G	Cool, 4°C ² store in the dark	28 days	100 mL
TOTAL Organic Halides By Method No. 9020/9021	G, TLC	Cool, 4°C ²	28 days	500 mL
PCBs	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1,000 mL/250 mL
Pesticides	G, TLC	Cool 4°C,	7 days until extraction, 40 days after extraction	1,000 mL/250 mL
Phenols	G, TLC	Cool, 4°C ³	7 days until extraction, 40 days after extraction	1,000 mL
Phthalate Esters	G, TLC	Cool, 4°C	7 days until extraction, 40 days after extraction	1,000 mL
Polynuclear Aromatic Hydrocarbons	G, TLC	Cool, 4°C ³ store in the dark	7 days until extraction, 40 days after extraction	1,000 mL/250 mL
Purgeable Aromatic Hydrocarbons	VOA	Cool, 4°C ^{2,3}	14 days	40 mL
Purgeable Halocarbons	VOA	Cool, 4°C ³	14 days	40 mL

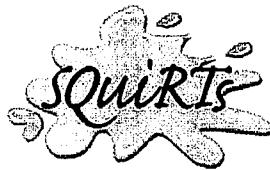
Sources

EPA SW846

1 P - Polyethylene; G - Amber glass containers; TLC - Teflon-lined cap; VOA - Volatile organic analyte vial of amber glass with teflon-lined septum.

2 Adjust to pH <2 with H₂SO₄, HCl, or solid NaHSO₄

3 Free chlorine must be removed before addition of HCl by exact addition of Na₂S₂O₃



Screening Quick Reference Table

Options for Selection of Analytical Methods: Inorganics

These tables were developed for screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

TRACE ELEMENT	OTHER ¹	FLAME AA	FURNACE AA	ICP	EXTRACTION METHODS	
					WATER	SOIL/SEDIMENT
Aluminum (Al)	6800	7020		6010B 6020A	3005A 3010A 3015A	3050B 3051A
Antimony (Sb)	6200(55) 6800	7040	7041 7062 ³	6010B 6020A	3005A 3015A	3050B 3051A
Arsenic (As)	6200(60) 7063 7061A ³		7060 7062 ³	6010B 6020A	3005A 3010A 3015A 7063	3050B 3051A
Barium (Ba)	6200(60) 6800	7080A	7081 ³	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Beryllium (Be)		7090	7091	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Cadmium (Cd)	6200 6800	7130	7131A	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Calcium (Ca)	6200 6800	7140		6010B 6020A	3005A 3010A 3015A	3050B 3051A
Chromium (Cr), total	6200(200) 6800	7190	7191	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Chromium+6 (Cr+6)	7195 — 7199 ³				7195 — 7199	3060A
Cobalt (Co)	6200(330)	7200	7201	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Copper (Cu)	6200(85) 6800	7210	7211 ³	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Iron (Fe)	6200 6800	7380	7381 ³	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Lead (Pb)	6200(45) 6800	7420	7421	6010B 6020A	3005A 3010A 3015A 3020A	3051A
Magnesium (Mg)	6800	7450		6010B 6020A	3005A 3010A 3015A	3050B 3051A
Manganese (Mn)	6200(240)	7460	7461	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Mercury (Hg)	4500(0.5) 6200 6800 7470A 7471B 7472 7473 7474 ³			6020A	7470A 7472 3015A	3051A 7471B 7473 7474
Molybdenum (Mo)	6200(25) 6800	7480	7481	6010B	3005A 3010A 3015A 3020A	3050B 3051A
Nickel (Ni)	6200(100) 6800	7520	7521	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Potassium (K)	6200 6800	7610		6010B 6020A	3005A 3010A 3015A	3050B 3051A
Selenium (Se)	6200 6800 7741A 7742 ³		7740	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Silver (Ag)	6200 6800	7760A	7761 ³	6010B 6020A	3005A 3015A	3051A 7760 7761
Sodium (Na)		7770		6010B 6020A	3005A 3010A 3015A	3050B 3051A
Strontium (Sr)	6200(30) 6800	7780		6010B	3015A	3050B 3051A
Thallium (Tl)	6200 6800	7840	7841	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Tin (Sn)	6200(85)	7870				
Vanadium (V)	6200 6800	7910	7911	6010B 6020A	3005A 3010A 3015A 3020A	3050B 3051A
Zinc (Zn)	6200(80) 6800	7950	7951 ³	6010B 6020A	3005A 3010A 3015A	3050B 3051A
Cyanide (HCN)	9010B — 9014 ³					

Sources

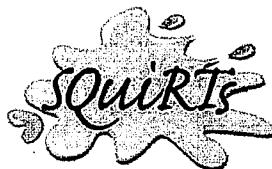
All method numbers refer to EPA SW-846, Volume III with changes as proposed for Volume IV.

ICP's advantage is that it allows simultaneous or rapid sequential determination of many elements, but suffers from interferences. AA determinations are normally completed as single element analyses. ICP and Flame AA have comparable detection limits (within a factor of 4), but ICP-MS (6020A) can drastically improve the detection limits (e.g., an order of magnitude lower). Furnace AA generally exhibits lower detection limits than ICP or Flame-AA, and offers more control over unwanted matrix components. X-RAY and immunoassays allow field determinations.

1 Method 6200 is Portable X-Ray; 6800 is Elemental/Isotope Mass Spec.; 4500 is Immunoassay; 7063 is ASV; where available, soil detection limits in ppm are in parentheses.

2 Except as noted, most individual procedures are proposed to be integrated into Method 7000B or 7010.

3 Includes various methods. Follow the extraction procedure detailed in the individual determinative method.



Screening Quick Reference Table

Options for Selection of Analytical Methods: Organics

These tables were developed for screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

COMPOUNDS	FIELD METHODS	OC/MS METHOD	SPECIFIC DETECTION METHOD	HPLC METHOD	EXTRACTION METHODS		CLEANUP METHOD
					WATER	SOIL/SEDIMENT	
Aromatic and Halogenated Volatiles		8260B	8021B		5021 5030B 5032	5021 5032 5035	
Carbamates				8318 8321B	8318 8321B		8318
Chlorinated Dioxins and Furans			8280B 8290A		8280B 8290A	8280B 8290A 3545A	8280B 8290A
Chlorinated Hydrocarbons		8270D	8121		3510C 3520C 3535A	3540C 3550B	3620B 3640A
Chlorinated Phenoxyacids	4015 (0.1 ppm)	8270D 2	8151A	8321B	8151A 8321B 3535A	8321B 8151A 3545A 3580A	8151A 3620B
Haloethers		8270D	8111		3510C 3520C	3540C 3545 3550B	3620B 3640A
Nitriles and Amides		8260B	8031 8032A 8033	8315 8316	5030B — 5032 8031 8032A 8316	5031 5032 5035	8032A
Nitroaromatics and Ketones		8270D	8091	8330A	3510C 3520C 3535A	3540C 3545 3550B	3620B 3640A
Nitroaromatics (Explosives)	4050 (0.5 ppm) 4051 8515 (1 ppm)			8330A - 8332	8330A — 8332	8330A — 8332	8330A — 8332 3620B
Nitrosamines		8270D	8070A		3510C 3520C 8070A	3540C 3545 3550B 8070A	3610B 3620B 3640A 8070A
Non-Halogenated Volatiles		8260B	8015B		5030B — 5032	5021 5031 5032 5035	
Organochlorines	4040 — 4042 (0.2 to 20 ppm)	8270D 2	8081B 8275A		3510C 3520C 3535A	3540C 3545A 3550B 3562	3620B 3630C 3640A 3660
Organophosphates		8270D 2	8141B	8321B	3510C 3520C 3535A	3540C 3545A 3550B	3620B
PAHs	4035 (1 ppm)	8270D	8100 8275A	8310	3510C 3520C	3540C 3545 3550B 3561	3610B 3630 3640A 3650B
PCBs	4020 (5 ppm) 9078 (2 ppm)	8270D 2	8082A 8275A		3510C 3520C 3535A	3540C 3545A 3550B 3665A 3562	3620B 3630C 3640A 3660 3665A
Phenolics	4010A (0.5 ppm)	8270D	8041		3510C 3520C	3540C 3545 3550B	3630 3640A 3650B 8041
Phthalates		8270D	8061A		3510C 3520C 3535A	3540C 3545 3550B	3610B 3620B 3640A
Semi-Volatile Organics		8270D			3510C 3520C 3535A	3540C 3545A 3550B	3640A 3650B 3660
Total Organic Halides (TOX)			9020B 9022		9020B 9022		
Total Petroleum Hydrocarbons	4030 (5 ppm) 9074	8260B	8015B				
Volatile Organics			8015B 8021B		5030B — 5032	5021 5031 5032 5035	

Sources

All method numbers refer to EPA SW-846, Update III, with changes as proposed in Update IV.

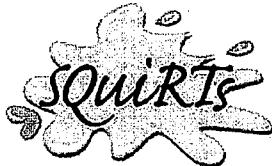
Options shown are generally for chemical classes; more detailed information may be available for specific compounds

GC/MS methods allow for scanning a broad range of volatile and semi-volatile compounds, but suffer from interference and higher detection limits.

Specific determination methods and HPLC methods allow for more precise determinations of specific compounds of interest.

1 Series 4000 are immunoassays and are for specific compounds within these classes (i.e., 2,4-D, TNT, RDX, and PCP). Soil detection limits are in parentheses.

2 This is not a method of choice, but rather a confirmatory method.



Screening Quick Reference Tables

These tables were developed for screening purposes only: they do not represent official NOAA policy and do not constitute criteria or clean-up levels. All attempts have been made to ensure accuracy; however, NOAA is not liable for errors. Values are subject to changes as new data become available.

Because trace elements are naturally occurring compounds, concentrations reflective of non-anthropogenically impacted, or "background," are provided in addition to toxicological benchmarks. For screening, trace element levels may be compared to the geometric mean (and range) observed in natural soils in the U.S. Further comparisons to regional values is encouraged.

Promulgated criteria or standards for sediments or soils are generally not available in the U.S. For screening purposes, contaminant levels in solids (sediment or soil) may be compared to benchmarks representative of different characterizations of ecological risk. They should **not** be applied without a reasonable understanding of their development, their performance, and their limitations.

The NOAA SQuRTs include multiple sediment screening values to help portray a spectrum of concentrations which have been associated with various probabilities of adverse biological effects. This spectrum ranges from presumably nearly non-toxic to toxic levels. For instance, if all analytes screen below lower-threshold values (for example, TELs), this suggests, with a high degree of confidence, that a sample with these levels of contaminants has a low probability of being toxic, as tested through standard bioassays. Conversely, exceeding lower thresholds does **not** necessarily predict toxicity. Comparison to higher toxicity thresholds (for example, PELs) identifies compounds which are more probably present at elevated, toxic levels.

Sources of benchmarks for sediment were chosen primarily on the basis of representing a fairly unique approach for their derivation. A major exception is the "Consensus TEC/PEC" values: these values are simply averages of other existing benchmarks (mostly those appearing in the SQuRT cards). The consensus TEC/PECs are provided here merely as a service.

For soil- and sediment-associated contaminants, dry weight concentrations are screened directly against published benchmarks. Some benchmarks are available only on a Total Organic Carbon (TOC) normalized basis, and are footnoted as such. Separate values are provided for either freshwater and estuarine or marine sediments.

For freshwater sediments, the Upper Effects Threshold (UET) was derived by NOAA as the lowest AET from a compilation of endpoint analogous to the

marine AET endpoints. The UETs for organic contaminants are generally listed for a sediment containing 1% TOC.

This version of the SQuRT cards adds a section on the composition of PCBs. A characterization of Aroclors by their degree of chlorination and congener patterns may aid in *preliminary* exploration of source type. Definitive Aroclor assignment should only be conducted by a qualified chemist.

To express cumulative toxicity from mixtures of dioxins and furans, Toxic Equivalency Factors are included in this version of the SQuRT cards. Absolute concentrations can be multiplied by the TEF potency factors and the products then summed to derive total toxicity.

Every effort has been made to ensure accuracy in these SQuRT cards. However, NOAA is not liable for errors in original sources or revision of values. These screening values are subject to change as new data become available. The SQuRT cards may be freely reproduced and distributed, if they are distributed in their entirety, without modification, and properly credited to NOAA.

The SQuRT cards should be cited as:

"Buchman, M. F., 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages."

Addendum C

Sample Container Requirements

Sample Collection Requirements for CLP and SESD

Water

- **BNA= Base Neutral Acid or Extractables**

1 Matrix Spike/Matrix Spike Duplicate (**MS/MSD**) required per 20 samples

Sample Only =



1L Amber Glass + 1L Amber Glass = 2 bottles
Sample Extra vol

Sample + MS/MSD =



1L Amber + 1L Amber + 1L Amber + 1L Amber = 4 bottles
Sample Extra vol MS MSD

Preservative = Ice to 4° C.

- **Pesticides** 1 MS/MSD required per 20 samples

Sample Only =



1L Amber Glass + 1L Amber Glass = 2 bottles
Sample Extra vol

Sample + MS/MSD =



1L Amber + 1L Amber + 1L Amber + 1L Amber = 4 bottles
Sample Extra vol MS MSD

Preservative = Ice to 4° C.

Sample Collection Requirements for CLP and SESD

Water

- **PCB's = Polychlorinated Biphenyls** 1 MS/MSD required per 20 samples

Sample Only =



1L Amber Glass + 1L Amber Glass = 2 bottles
Sample Extra vol

Sample + MS/MSD =



1L Amber + 1L Amber + 1L Amber + 1L Amber = 4 bottles
Sample Extra vol MS MSD

Preservative = Ice to 4° C.

- **VOA = Volatile Organic Analysis** 1 MS/MSD required per 20 samples

Sample Only =



1- 40ml + 1- 40ml + 1- 40ml = 3 bottles
Sample Screen Extra vol

Sample + MS/MSD =



40ml + 1-40ml + 1-40ml + 1-40ml = 6 bottles
Sample Screen Extra MS MSD Extra

Preservative = HCl pH<2

Sample Collection Requirements for CLP and SESD

Water

- **VOA + SIM (CLP Only)** = Volatile Organic Analysis + Selective Ion Monitoring
1 MS/MSD required per 20 samples

Sample Only =



1-40ml + 1-40ml + 1-40ml +

1-40ml = 4 bottles
Sample Extra SIM Extra

Sample + MS/MSD =



1-40ml + 1-40ml + 1-40ml + 1-40ml + 1-40ml + 1-40ml = 6 bottles
Sample Extra SIM MS MSD Extra

Preservative = HCl pH<2

- **Metals or Metals + Mercury** 1 MS/D required per 20 samples

No additional volume for MS/D

Sample Only or Sample + MS/D = 1 L poly

Preservative = HNO₃ pH<2



Cyanide 1 MS/D required per 20 samples

Sample Only or Sample + MS/D = 1 L poly

Preservative = NaOH ph>12

Sample Collection Requirements for CLP and SESD

Soil/Sediment

- **Base Neutral Acids + Pesticides + PCB's** 1 MS/MSD required per 20 samples

Sample Only = 1- 8oz Glass Sample



Sample + MS/MSD =
1- 8oz Glass + 1- 8oz Glass Sample MS/MSD



Preservative = Ice to 4° C.

- **VOA = Volatile Organic Analysis** 1 MS/MSD required per 20 samples

Sample Only =



3- 5g EnCores®

+ 1- 2oz jar for % moisture and calcareous content

Sample + MS/MSD =



9- 5g EnCores® + 1- 2oz jar for % moisture and calcareous content



Preservative = Ice to 4° C.

- **Metals + Mercury + Cyanide** 1 MS/MSD required per 20 samples

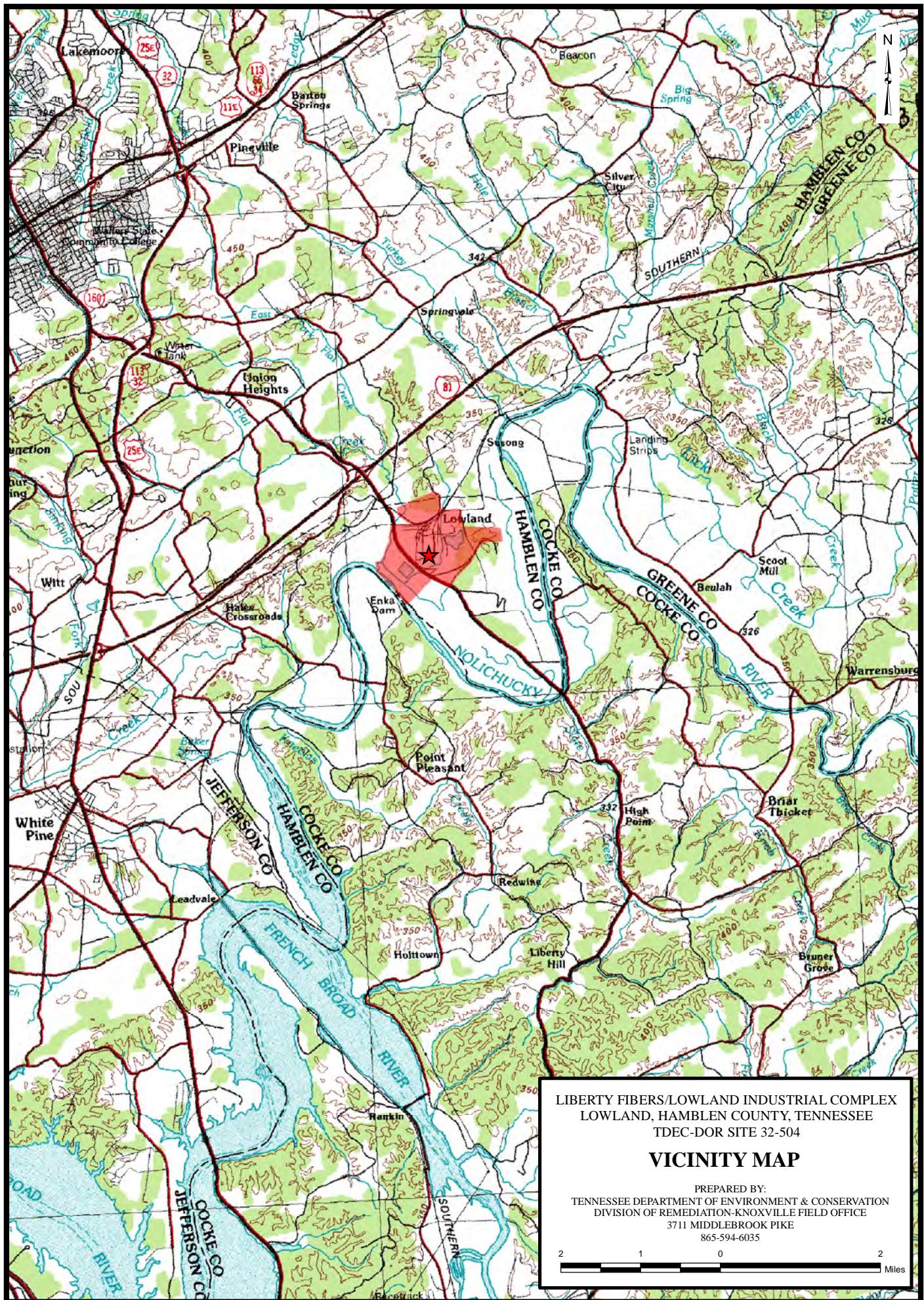
Sample Only or Sample + MS/MSD = 1- 8oz Glass




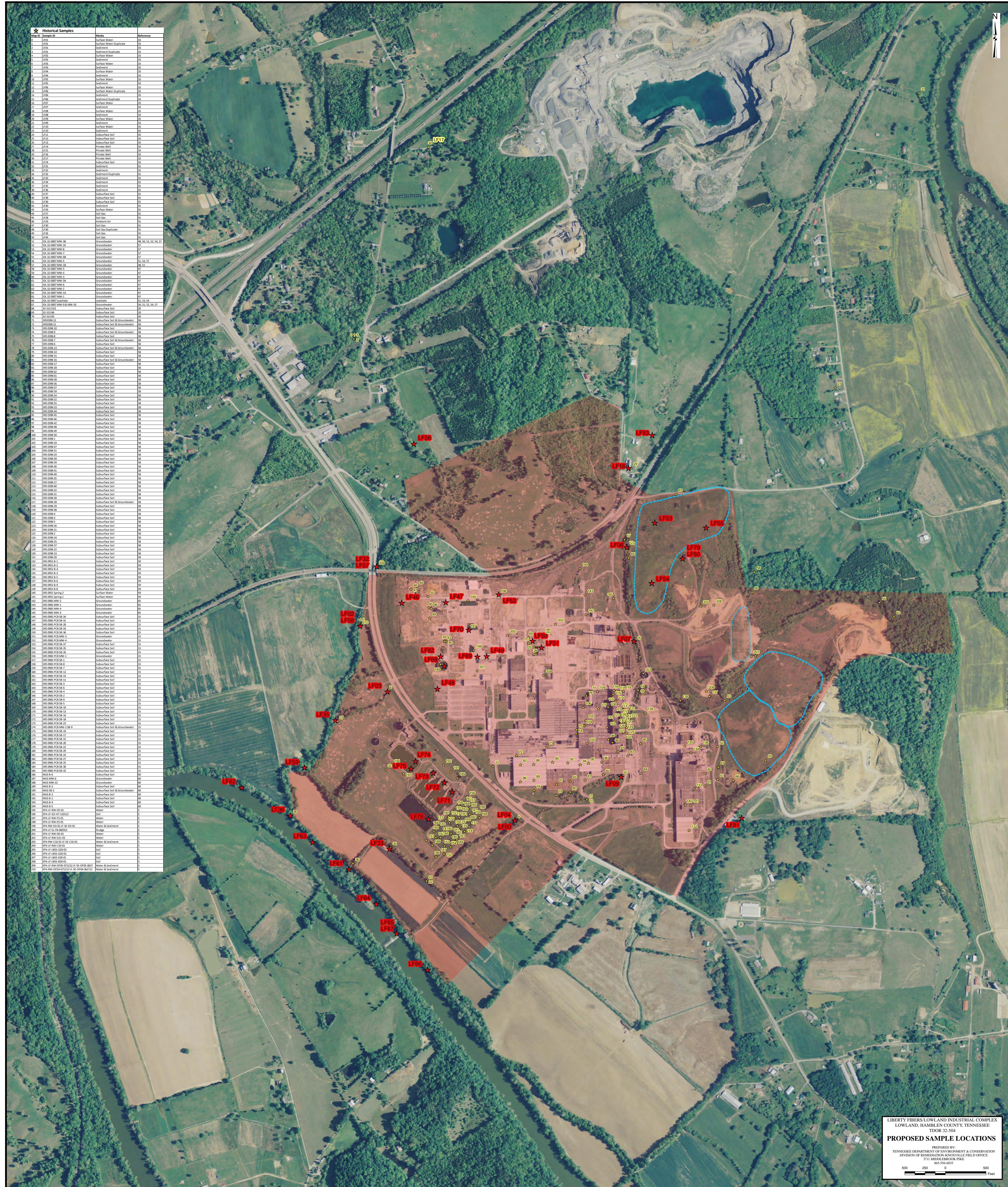
Preservative = Ice to 4° C.

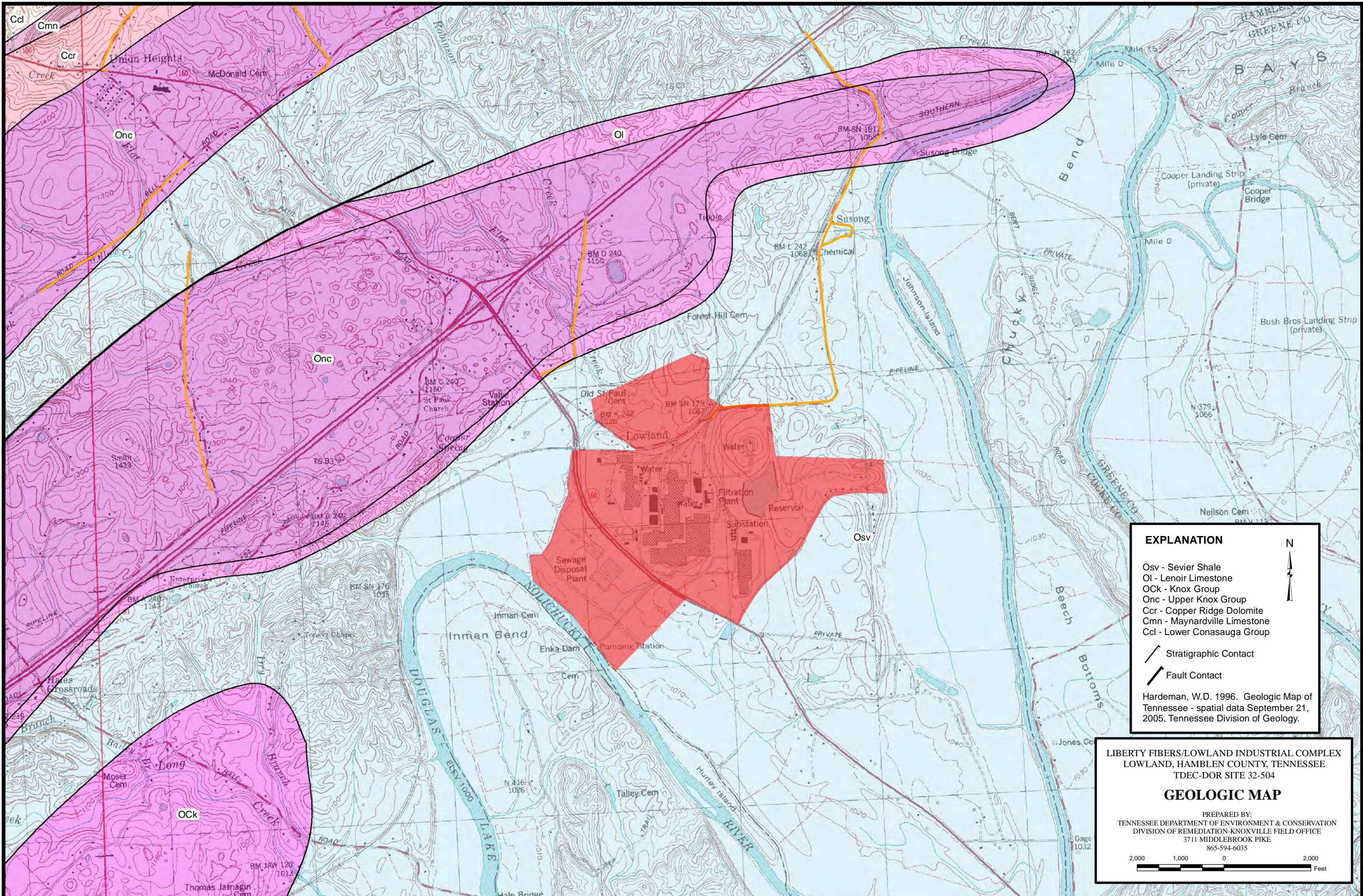
Addendum D

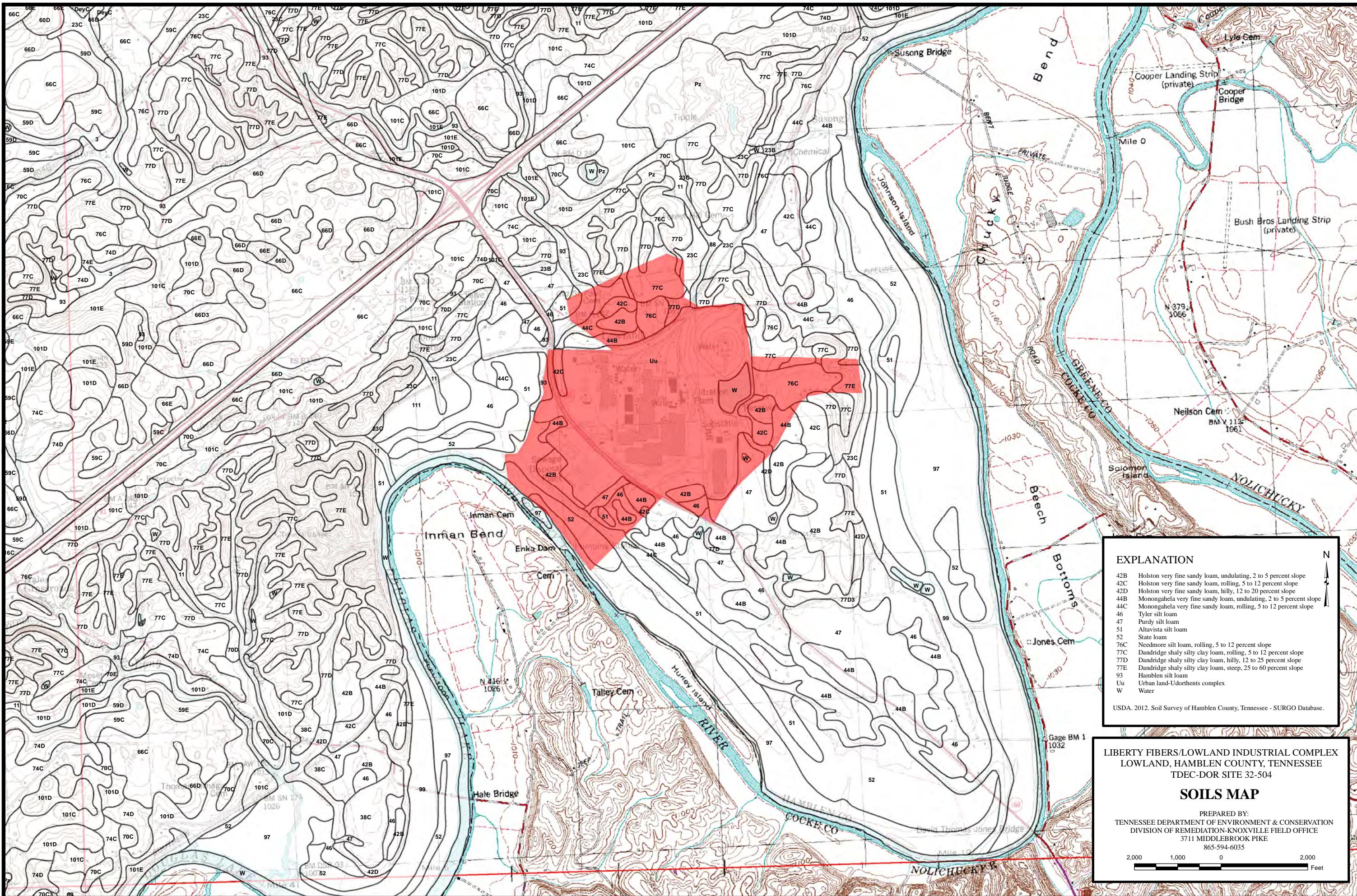
Sample Location Map









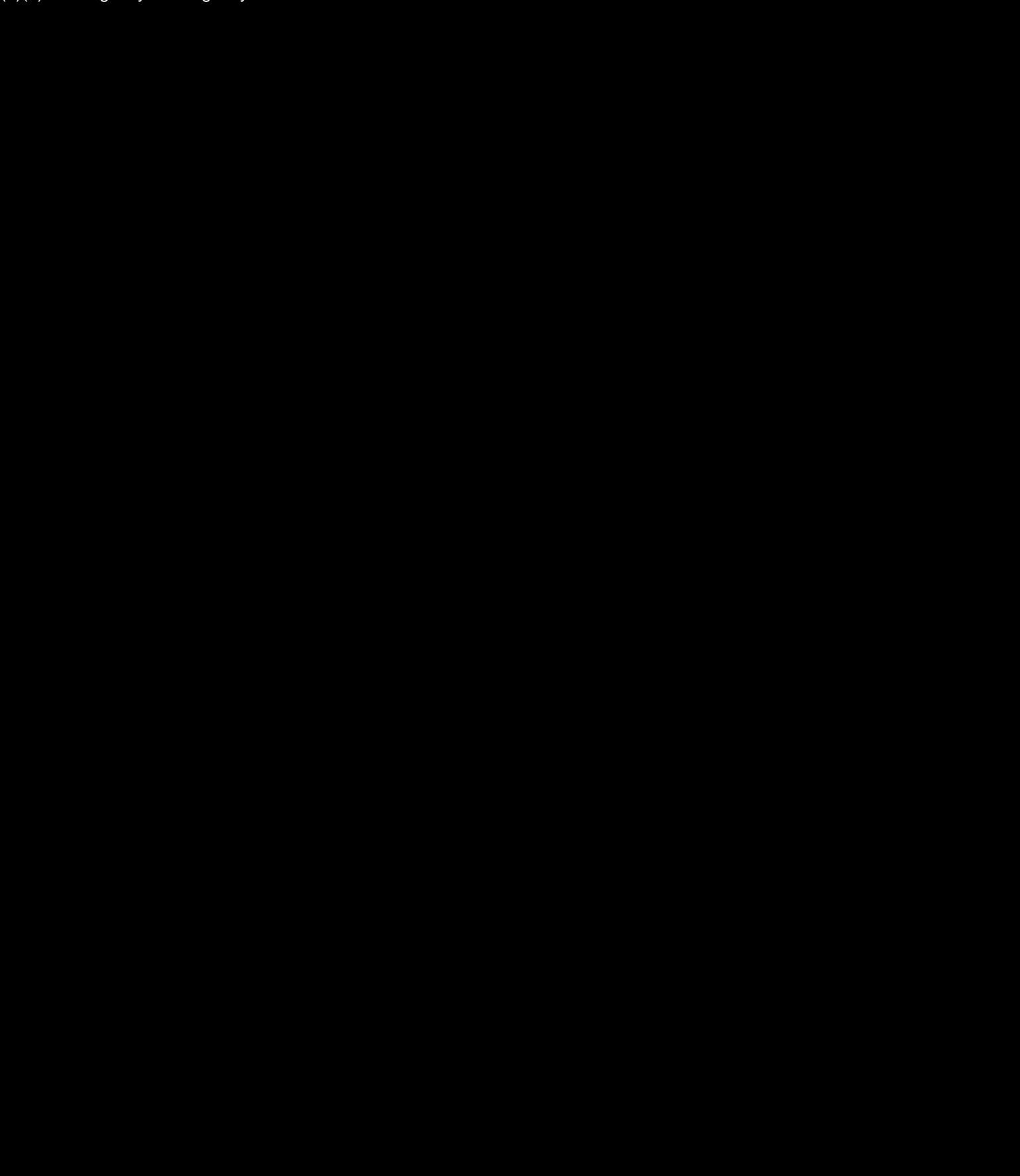


Addendum E

Quickscore Summary Sheets

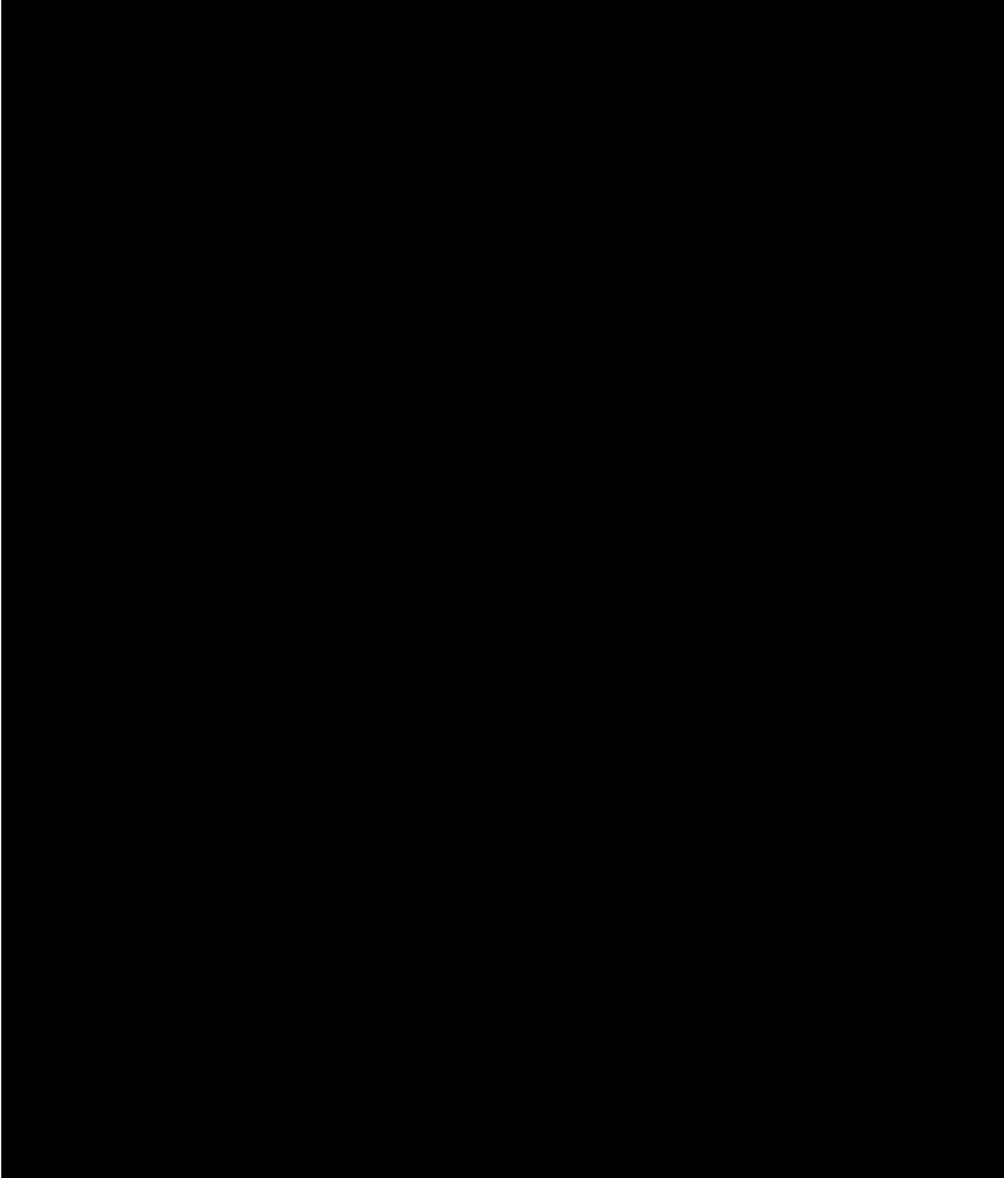
(b)(5) Inter-agency/intra-agency communications

(b)(5) Inter-agency/intra-agency communications

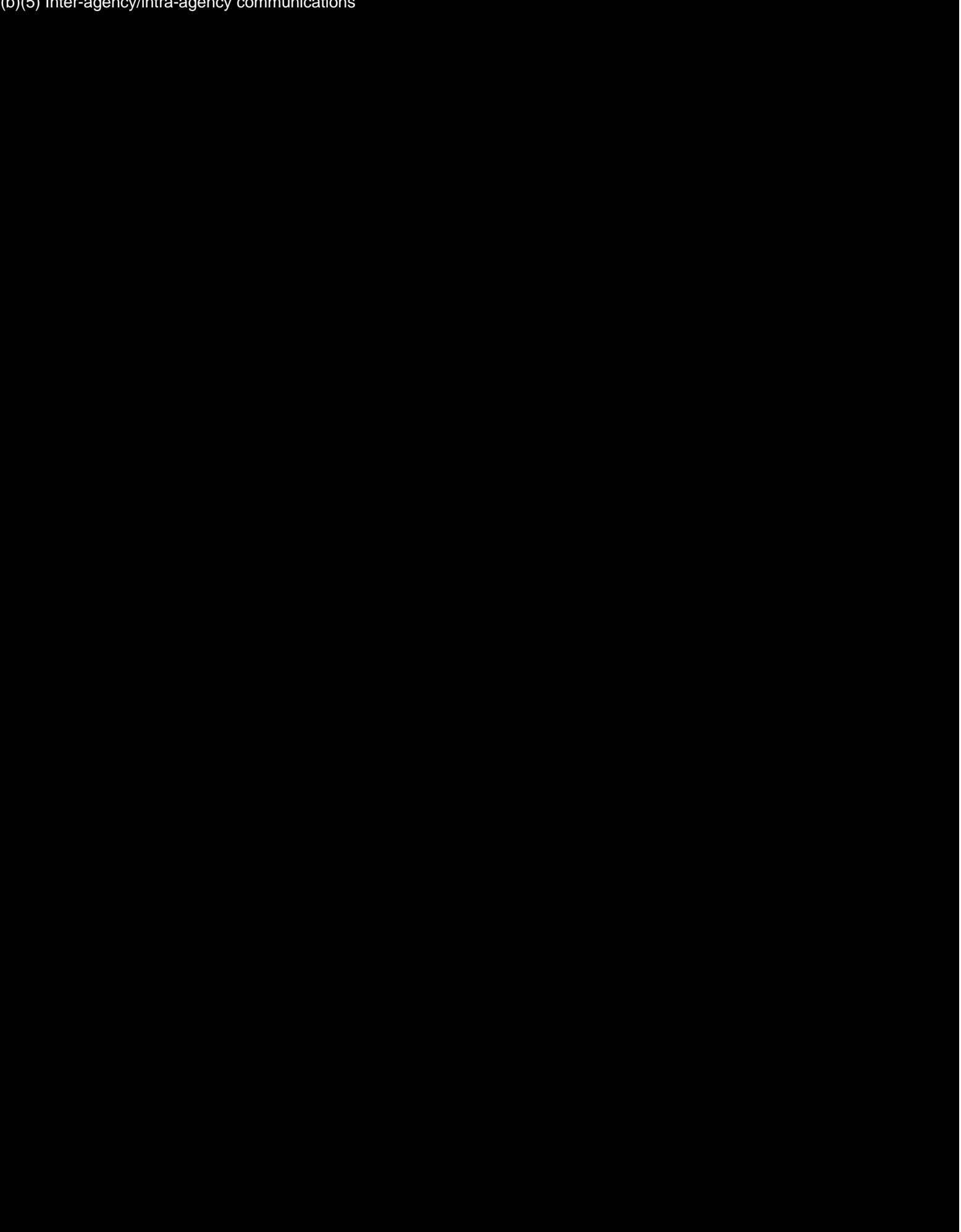


(b)(5) Inter-agency/intra-agency communications

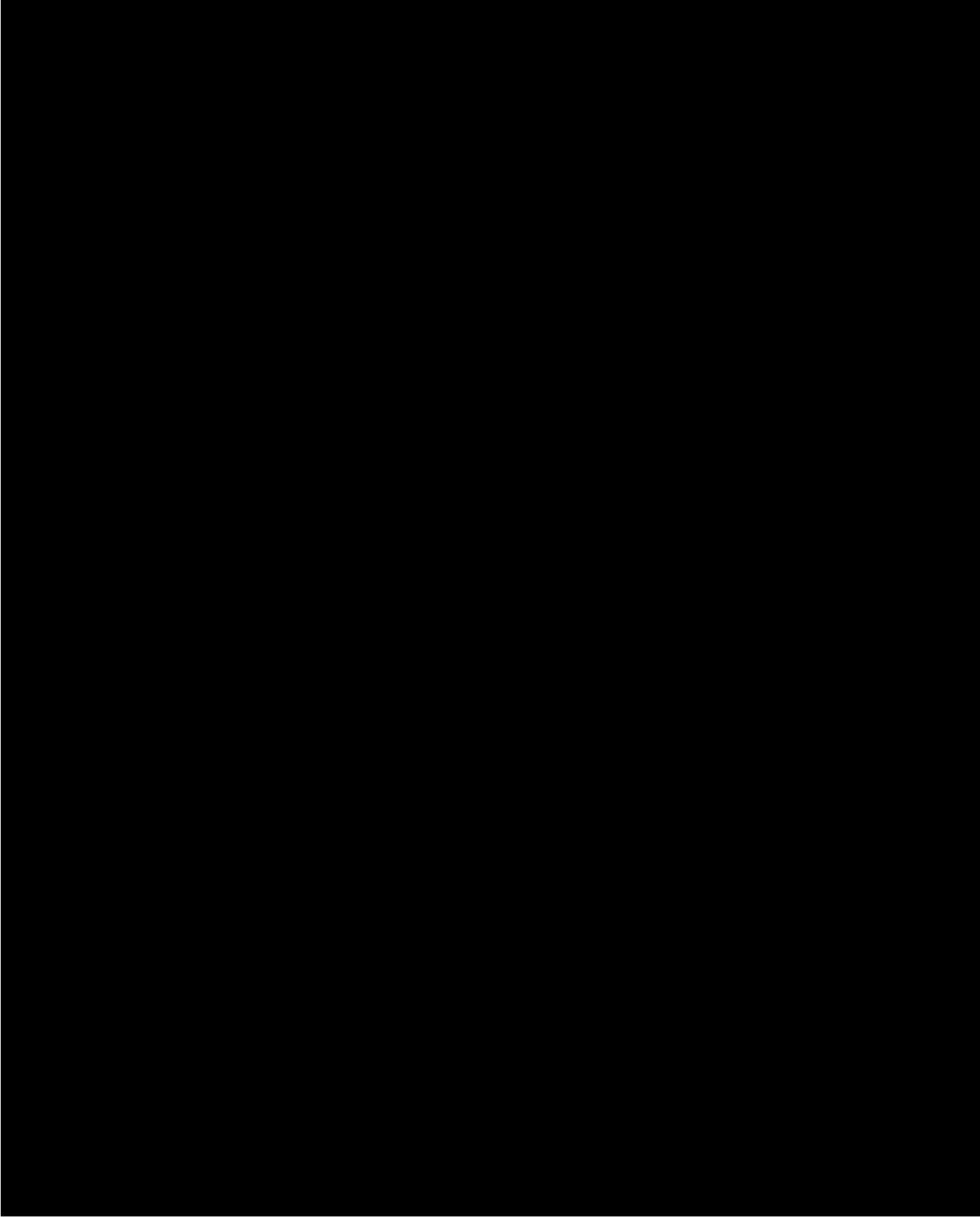
(b)(5) Inter-agency/intra-agency communications



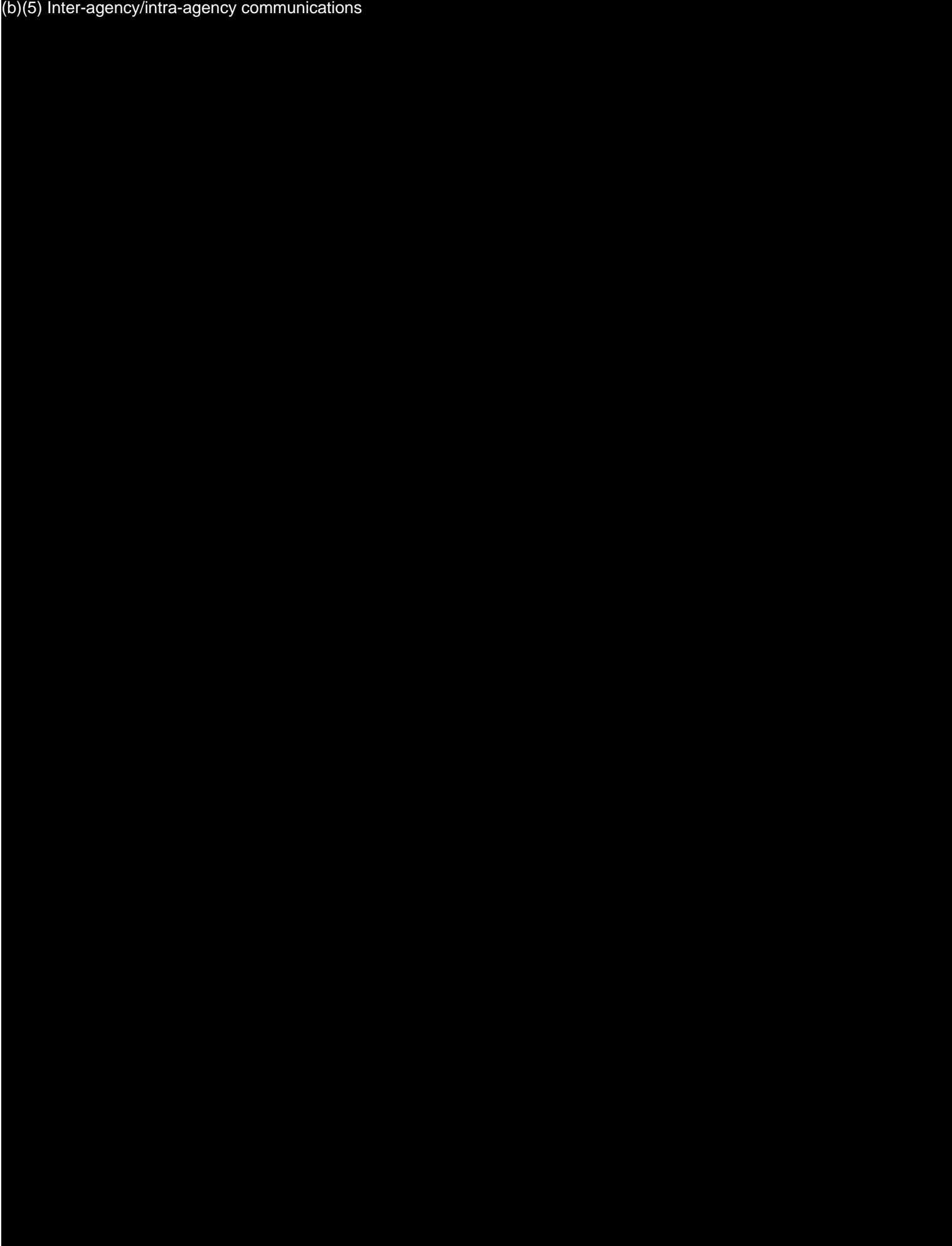
(b)(5) Inter-agency/intra-agency communications



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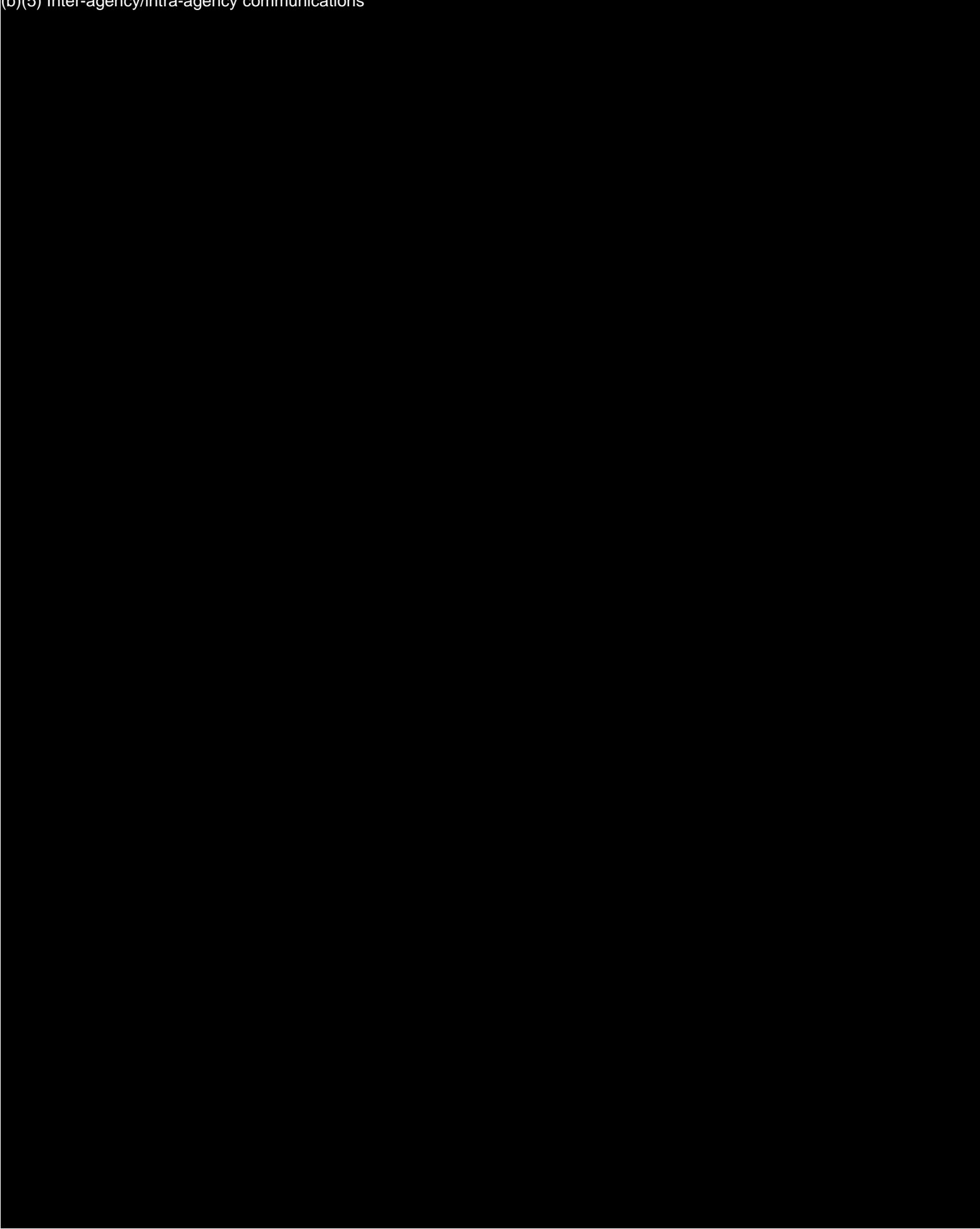
(b)(5) Inter-agency/intra-agency communications

(b)(5) Inter-agency/intra-agency communications

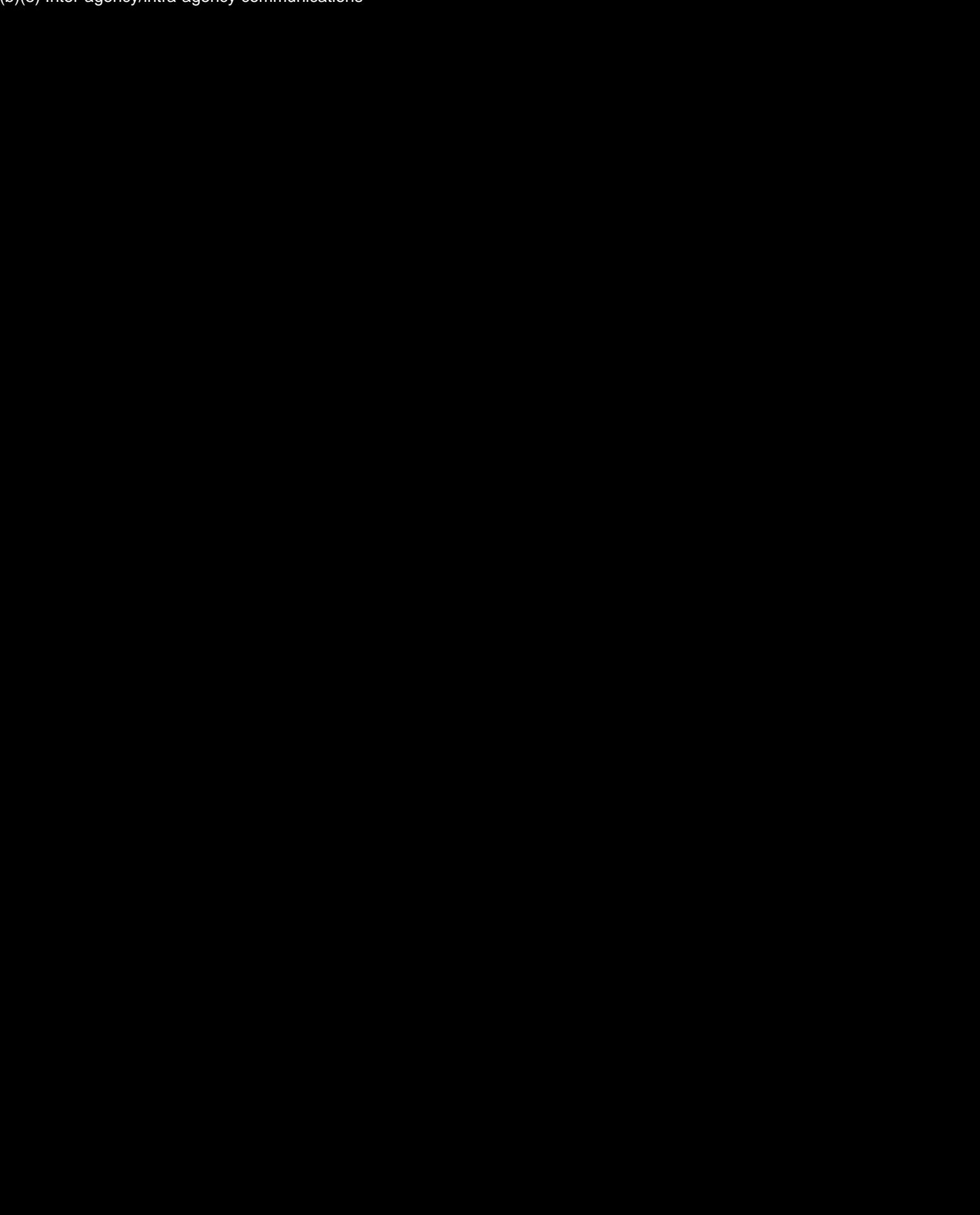
(b)(5) Inter-agency/intra-agency communications

(b)(5) Inter-agency/intra-agency communications

(b)(5) Inter-agency/intra-agency communications

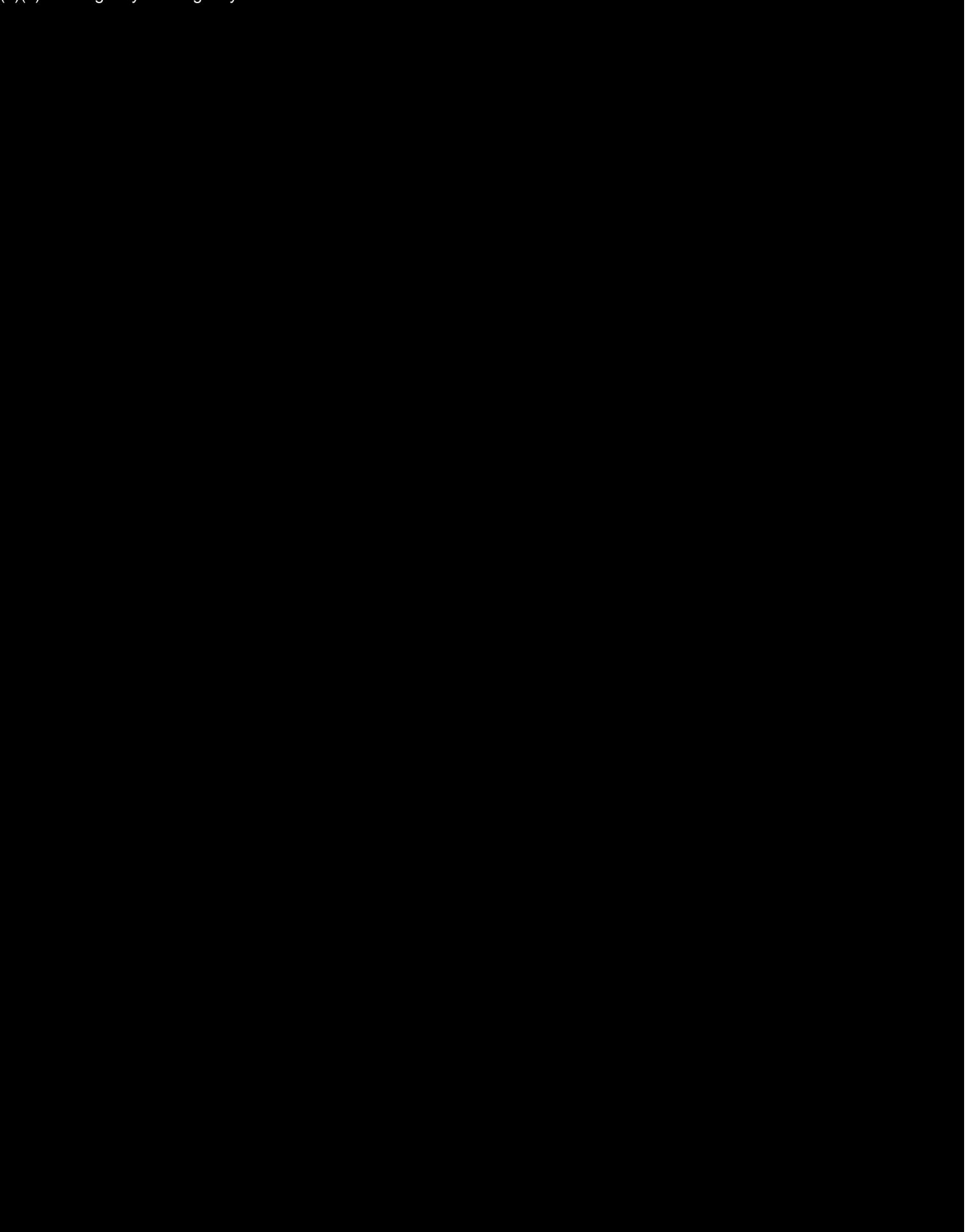


(b)(5) Inter-agency/intra-agency communications

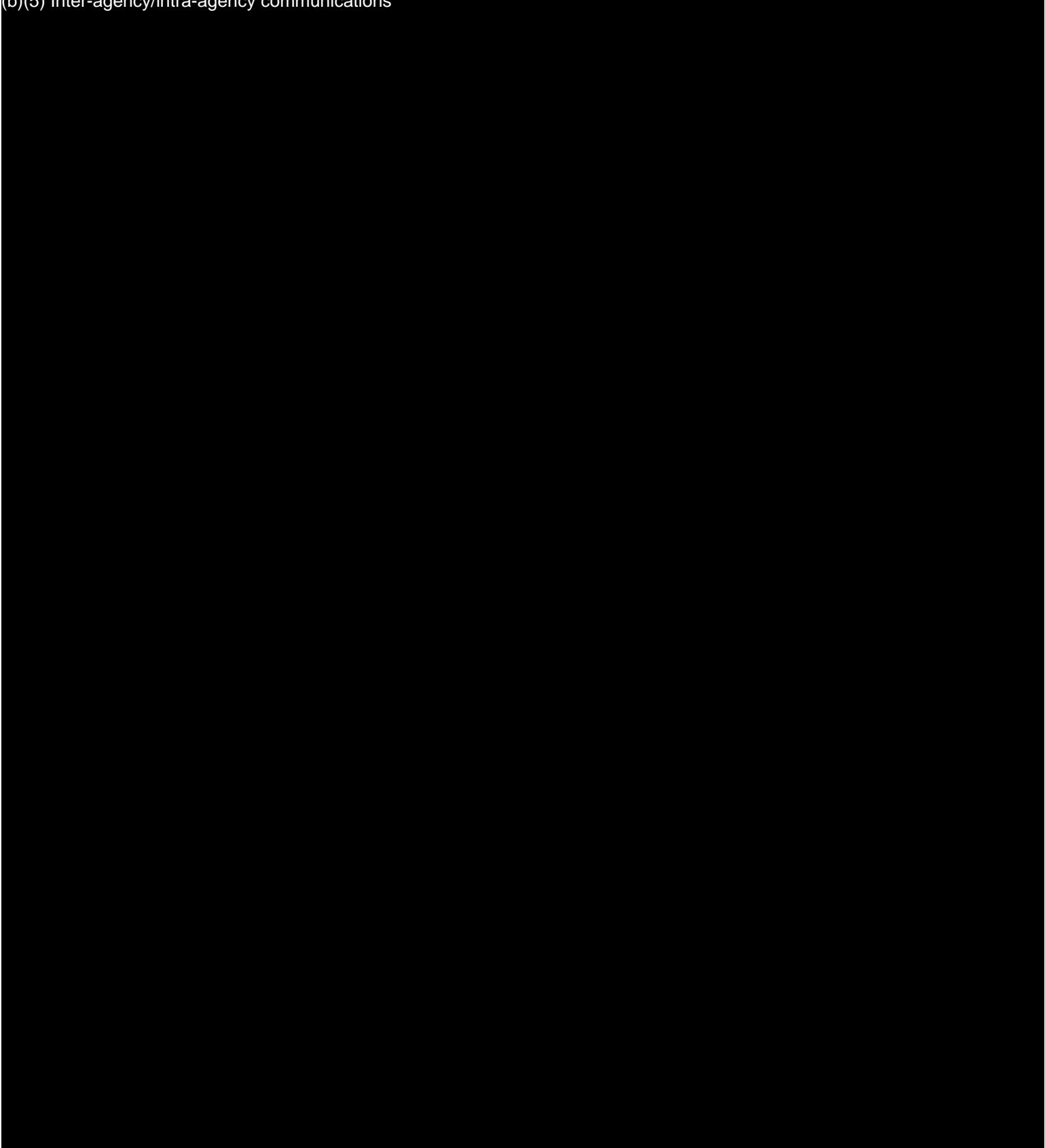


(b)(5) Inter-agency/intra-agency communications

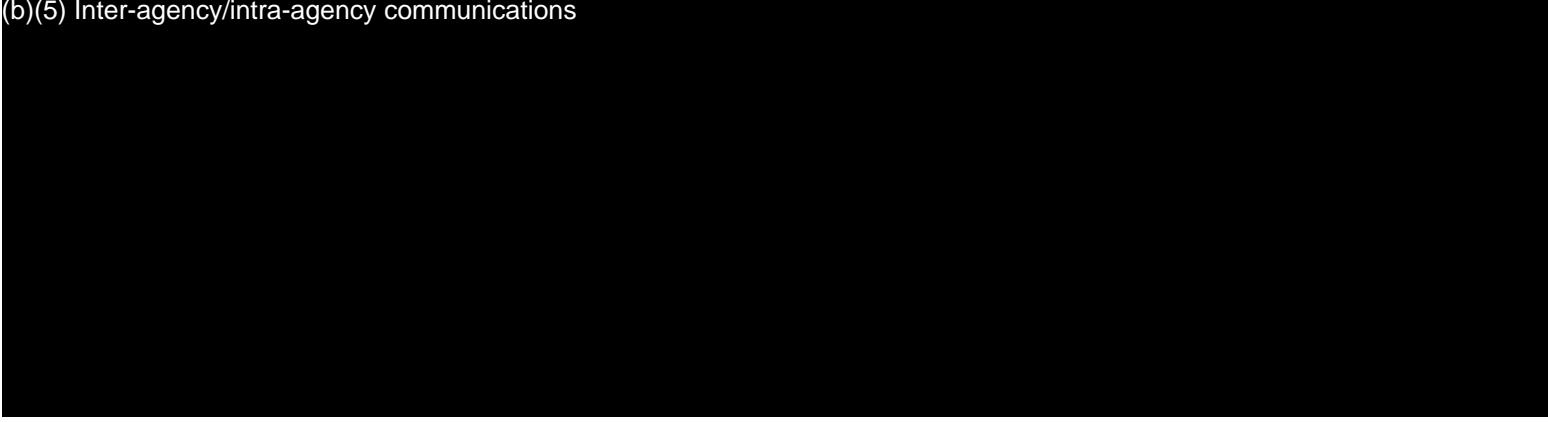
(b)(5) Inter-agency/intra-agency communications



(b)(5) Inter-agency/intra-agency communications



(b)(5) Inter-agency/intra-agency communications



Addendum F

ROUTE TO NEAREST HOSPITAL

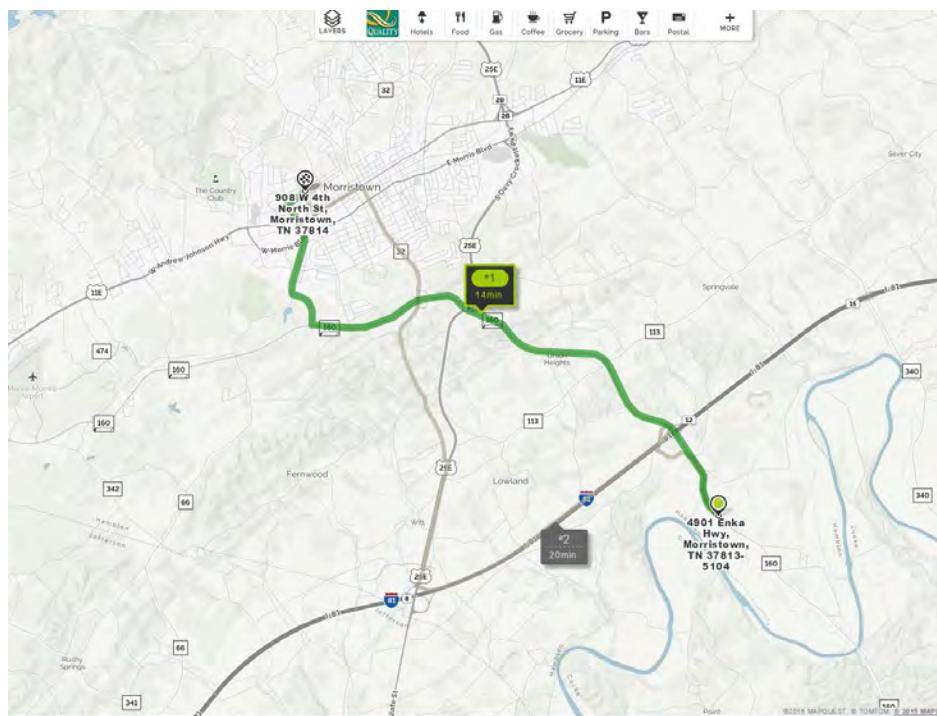
Route to Nearest Hospital:

Morristown Hamblen Healthcare System

908 W 4th N Street

Morristown, TN 37814

(423)492-9000



Start out going northwest on Enka Hwy/TN-160 toward Chucky River Rd. Continue to follow TN-160.

6.93 MI

Turn right onto Dr Martin Luther King Jr Pkwy/TN-66.

0.56 MI

Take the 1st right onto TN-66/Jarnigan Ave. Continue to follow TN-66.

0.99 MI

Turn left onto W Andrew Johnson Hwy

0.03 MI

Turn slight right onto N Fairmont Ave.

0.26 MI

Turn right onto W 6th North St.

0.29 MI

908 W 4TH NORTH ST.

Addendum G

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